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THE
ILLUSTRATED
CANADIAN
FORESTRY
MAGAZINE

VOL. XVII. OTTAWA, CANADA, AUGUST, 1921. No. 6

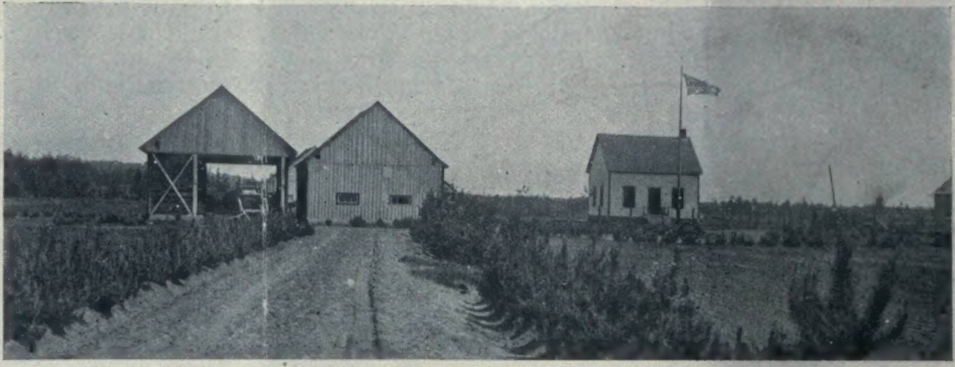
Tree Planting as a Replenisher of Our Timber Supply

A Planted Area of 250 Square Miles Would Yield 100,000 Cords of Pulpwood Each Year in Perpetuity.

By Ellwood Wilson,

Chief Forester, The Laurentide Company, Grand Mere, P. Q.

The Editor has asked me to discuss the relative merits of artificial vs. natural replacement of our forests, or, in other words, whether it is better to let our forests alone after we have cut them, trusting to nature to reproduce them, or whether it is better to make plantations and to fill out those places in the forest where nature has not finished the job. It would be just as unreasonable to ask me to discuss, in general, the relative merits of dry farming and ordinary farming in a region blessed with normal rainfall. No farmer in such a region would dream of dry farming, and no farmer in an arid region would attempt to farm in the ordinary way. He would be a fool if he did. A forester who should attempt to plant trees on an area which nature had already stocked with 1,500 good trees to the acre would be equally foolish if he left nature to seed in a tract of bare land with no seed trees within miles of it. The two methods are complementary and must be employed together. Each has its proper place and part in a general forestry policy, and which shall be adopted depends entirely on the location and the end desired.



Growing trees and good citizens. The Laurentide Company maintains a public school on its Tree Nursery at Proulx, Quebec, where free education is provided to the children not only of the nursery employees, but of farmers in the surrounding district.

A new seed bed at the Laurentide Company's nursery station. The men are engaged in planting white spruce seed gathered in the St. Maurice Valley.

How Nature Works.

Let us see now what the conditions are when nature has had a free hand, taking as our example a section of the St. Maruice Valley of Quebec where we have accurate information. The description will be much condensed, as it would take too much space to go into much detail. We find, in general, a rough country, broken by ridges, with many lakes, some swamps, and a poor soil underlaid with granite. In the very wettest swamps there is nothing but coarse grass, where the swamps are not so wet we have stunted black spruce, often well over 100 years old

Girls are here engaged "threading" seedling trees into the planting boards, which are then carried to the trenches in the open field.

The militant woman once more! Girls become very adept in plantation work. Here we see a healthy, happy group taking up spruce trees to be transplanted to permanent sites.

and only five or six inches on the stump. In the valleys we have stands of red and white spruce and fir, and on the ridges, birch, yellow and white, maple, some hemlock and spruce and fir. Where fire has passed over the country, white birch and aspen have come in, and later spruce and fir have entered the mixture. In some sections where the soil is sandy we have pure stands of Jack Pine which have seeded in after a fire. Other sections have small stands of red pine and through all the forest we find individual white pine, the remnant of earlier stands.

Concentrating the Wood Crop.

As today, owing to lack of transportation and sufficient demand, there is very little use for the so-called hardwoods, that is trees which lose their leaves in the winter, we shall leave out of this discussion everything but the softwoods, and of these confine ourselves to the spruce and fir. Under natural conditions the average number of such trees, four inches and over at breast height, is 160 per acre. A fully stocked stand of mature trees, 12 inches in diameter at breast height might possibly run to 400 trees per acre. The average stand of softwood in the St. Maurice Valley, 4 inches and up at breast height, is 11 cords per acre. Our fully stocked stand would give 75 cords per acre. The best natural stand of which I have any record in this section gave 40 cords per acre four inches and up, and was pure black spruce. Now there is a good deal of difference between 40 cords per acre and 75, and our planted stand would be almost 100 per cent better than we get under the very best natural conditions.

The great need in Canada is for accurate information about our forests. The public would be much surprised if they could see how little information lumber companies and pulp companies have about their timber lands, how few of them even have maps which are in any way complete or accurate. Information as to areas burned over and species and stands per acre is almost wholly lacking. This is realized and many of the larger pulp and paper companies have engaged foresters and are getting this information as rapidly as possible. The Commission of Conservation has done splendid work along these lines and the Dominion Forestry Branch has made a good beginning. So many men who attempt to discuss these subjects have very little acquaintance with the woods, except as they see them from a canoe or logging road. They are likely, in travelling through the woods and seeing here and there good samples of natural reproduction, jump to the conclusion that nature can take care of the future, if we keep the fire out, not realizing perhaps how much time has been wasted by nature in getting reproduction started, or how scattered such reproduction is.

In handling a forest property, it is absolutely necessary to look to the future and to plan operations for at least three generations ahead and it is necessary to decide what end you wish to arrive at. The right policy is one of perpetual wood production, the management of the

Here the planting-board has been opened. Note the little trees properly spaced and firmly set in the trench. The board is now withdrawn and earth firmly tamped about the roots.

forest for a sustained yield, and whichever method of regeneration, whether natural or artificial, that fulfills this end is meeting the requirements. Timberland owners must take stock of their areas, determine where planting is required, and so locate their plantations as to give a maximum yield with a minimum cost, which conditions will be most fully met by proximity to the mills and using species of rapid growth. Let us take a concrete case. Let us imagine a pulp company with a plant which has cost some ten to fifteen million dollars and which has built up around it a community of five to ten thousand souls. Let us take it for granted that the directors wish to continue to manufacture pulp for the next hundred years. They might of course decide to scrap their mill at the end of twenty-five years and let the community fall to pieces and return to the wilderness, as has been done in many a community built up around a large saw-mill in the United States, but have they a moral right to let the community dependent on their enterprise go to pieces? Are they not obliged to try and keep the community alive? In order to keep the mill going they must have wood. Let us further say, for the sake of argument, that our mill has timber enough standing to keep them going for twenty-five years—what shall they do after that is gone? In the first place, will the lands which they will cut over in that time restock themselves naturally? The investigations carried on by the Commission of Conservation on such lands, show that it will take fifty to sixty years to get a crop of merchantable timber and that it will average about one and a half cords per acre. Not enough to make logging possible. There are then two other possibilities, either they must buy virgin lands or they must help nature. Many mills have already adopted the first plan and have bought lands, often several hundred miles away form their plants, which they propose to hold for the future. The transportation charges on wood from these lands will be very heavy and they are not of the very best quality, being further to the northeast where the conditions for growing timber are not so favourable. On such lands held for the future, interest on the investment must be charged, fire protection is difficult and expensive, logging costs and transportation will be very high and the ultimate yield will brind only six to seven cords per acre cutting to Government demand limits.

A plantation of Scotch Pine set out in 1915. Laurentide Company's nurseries, Grand Mere, P.Q.

Changed Ways—Changed Ideas.

Logging as carried on in Canada in the past has taken no thought for the future, and the results are beginning to show in the increasing inaccessibility of the timber and the large increase in logging and transportation costs. The practice was to go into the territory as near the mill as possible, to take the timber along the shores of the lakes and rivers, and to get the trees which only needed to be hauled short distances. In other words, removing the accessible timber, with no thought of a second cut.

High stumps were left, also tops —a large part of which could have been utilized. Logs which were good for pulp were used to make camps and roads. Trees a little difficult to reach were left. Much young growth was destroyed. Much logging debris was left and too often areas logged one season were burnt the next. This was not done deliberately, and no great blame can attach to the men who did the work. They and the drectors of such companies were laboring under the same delusion as the general public, that we had timber for all time. Logs had to be got out cheaply in order to earn dividends. Now we know the situation and htat our supplies will not last for ever and we must devise ways and means to keep our industries going.

Make Each Acre Carry Timber

The statement has been made that all we need to do is to keep the fire out and let nature alone. This is manifestly wrong and I do not think that any forester who knows the conditions will subscribe to it. Something more must be done In casting around for better methods we have gone to Europe where they have passed through the same crisis and have found a remedy. They have been forced to log entirely differently. Instead of taking out the best tress they gradually remove the poorest trees, trying always to favor the young growth and increase the STAND PER ACRE. They want timber and they want as much as they can force each acre to raise. This means that their logging costs when they first begin to manage a natural forest are proportionately high, but that, as the stand per acre increases, the logging costs decrease. We must change our logging methods so as to attain the same end, but we also must go through a period of greatly increased costs in order to improve the condition of our forests. Those of us who have studied European conditions on the ground know that we cannot adopt their methods here without modification Foresters are agreed as to what must be done to improve logging conditions, but very few concerns are yet willing to spend the money or to reduce the cut per acre to accomplish these necessary ends.

The Case of Sweden.

Now let us glance for a moment at the attitude of European and Indian foresters who have sometimes centuries of experience to go on, toward natural reproduction unaided. At the Imperial Forestry Conference last summer only one forester would consider such a thing feasible and he was in charge of pine forests which reproduced very rapidly. All were in favor of aiding nature by planting. What is the practise in Sweden where conditions are admitted to be similar to our own? They have found that they cannot depend on nature alone and always fill out by planting the spaces left vacant by natural reproduction. They have a condition there which is very different from ours. The coniferous forests contain little hardwood while those of Eastern Canada abound with hardwoods, and cutting the softwoods encourages the hardwoods which gradually take up all the ground. In Sweden planting is just as much a part of their woods operations as is logging, they consider the two as part of their management of the forests.

There are thousands of acres in Canada which are unfit for agriculture and nearly always such areas can be found in reasonable proximity to our mills. Why not plant up such areas with valuable timber trees, aiding nature wherever she has made a start? Fire protection and management being over smaller areas would be cheaper and more intensive. Long drives, often taking two years, would be avoided, transport of men and provisions long distances would be done away with, local populations of men trained in woods work would be built up, as in Europe, logging costs would be much reduced as with the larger stands per acre, the use of logging machinery would be possible, and owing to the nearness and accessibility of the forest such large reserves of logs would not have to be carried with the large outlay for insurance and fire protection and interest on money tied up.

Will Planted Forests Pay?

A planted area of 250 square miles on a rotation of 50 years, that is five square miles cut clean and replanted each year, would yield 100,000 cords per annum in perpetuity, while it would take 1,302 square miles of natural forest to yield the same amount on the same rotation if the amount removed at the first cutting could be removed at the end of fifty years from the same area and this does not, in the light of our present knowledge seem possible. If the cost of carrying virgin timber lands to supply a cut at the end of forty years is figured it will be found that the cost per cord at the end of that time will be more than with planted trees and that the virgin stand will be steadily deteriorating through over maturity and insect damage while the planted stands will increase steadily in value year by year as they grow.

The great bulk of the timber in Canada belongs to the people at large and the cutting rights are leased to individuals and corporations. When this timber is cut should not the Governments make proper regulations for cutting and replanting so as to perpetuate and increase our timber supply? Canada's future economic welfare depends on the perpetuation of her forest resources. This can best be effected by proper utilization and by hastening nature's slow and wasteful methods of forest renewal by artificial regenera-

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THE IMPORTANCE TO THE PULP AND PAPER INDUSTRY OF CONSERVATIVE FOREST MANAGEMENT

By Percy B. Wilson; President, Canadian Pulp & Paper Association. Vice President, Spanish River Pulp & Paper Mills Ltd.

The forest is the foundation upon which the pulp and paper industry is built. Without available raw material, the established plants, so important to the welfare of the Dominion, must cease to function. It is essential that the mills already existing shall be supplied with wood, sufficient to meet their annual requirements. It is inconceivable that responsible executives should exploit a National inheritance of this matter without taking thought for the future prosperity of the country, or the industry.

When the pulp and paper industries of the country were established, it was felt the supply of raw materials was inexhaustible. Development of the natural resources, employment of labor, liquidation of the National assets of wood and water-power were the important factors to be considered. The capacity of the mills established was predicated upon the power that might be developed, and the capital available for investment, rather than upon the volume of wood that a definite area would yield annually forever.

The demand for Canadian pulp and paper products increased when the supply of available pulpwood in the United States began to show signs of depletion and the expansion of the Canadian Pulp and Paper industry followed. The larger mills demanded more extensive woods operations; with expanding woods operations, the cost of pulpwood constantly increased. Attention was then centered upon wood supply. It was realized that the quantity of **available wood,** rather than the total amount of wood in the Dominion, was the index of continuity of supply.

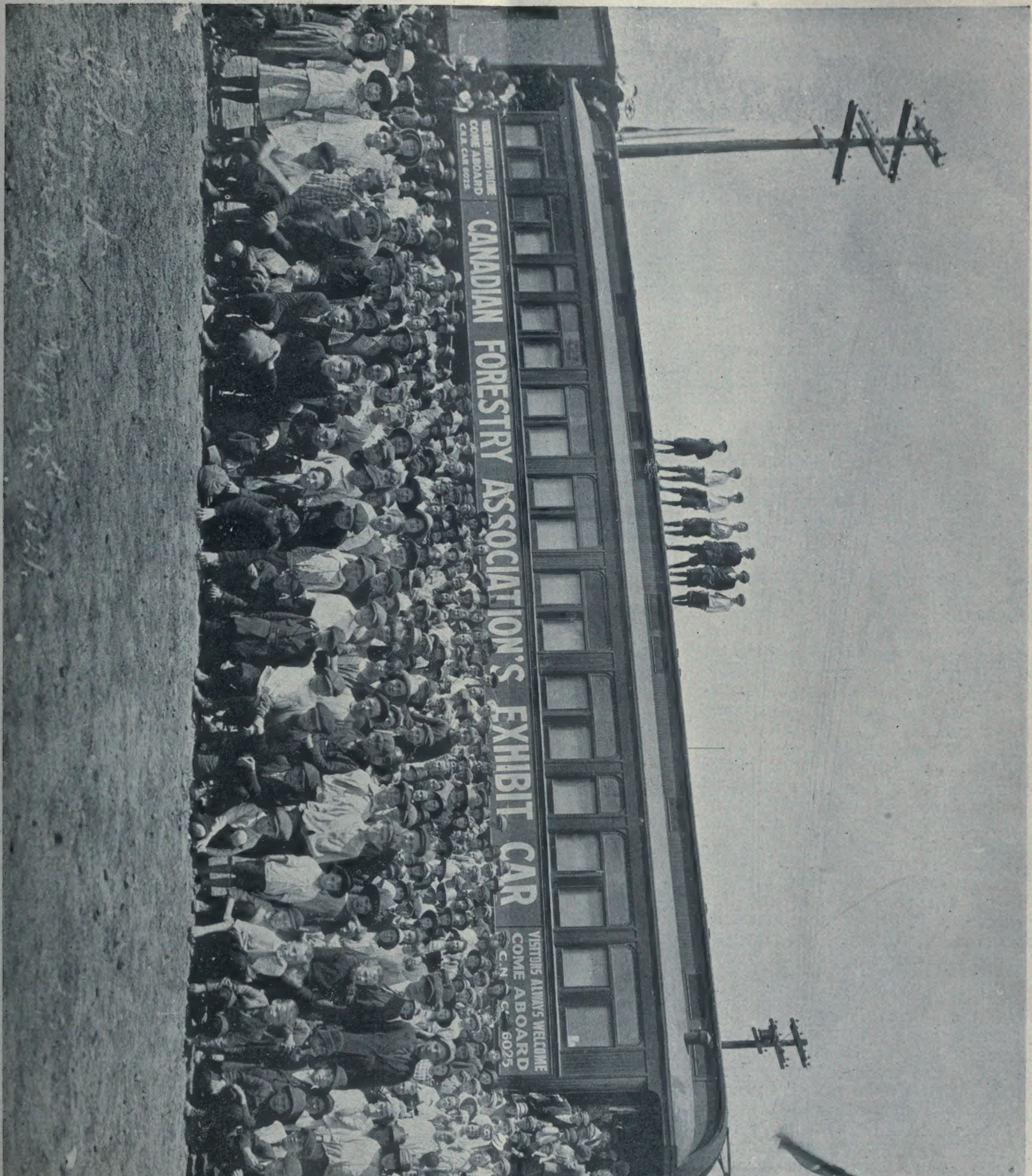
The quantity of wood available for any established plant is limited to the wood on the area from which the mill may draw its supply within certain limits of cost. Without devising means for the perpetuation of this supply, it is evident that the quantity will be exhausted in a given period, depending upon the extent of the area cut over annually.

Since the pulp and paper industry represents an enormous investment in mills and the necessary accomodation for labour, the latter involving in many cases the building up of new towns in the wilderness which, once established, cannot be moved, it is essential that the forests which supply the mills shall be perpetuated. This can be accomplished by no means except conservative forest management. Conservative forest management includes protection of the forest against fire, utilization of all wood in the stand that it is economically possible to use, and the introduction of systems of cutting that will insure regeneration of the stand.

As present investment is necessary to insure future income, the pulp and paper industry must invest in conservative forest management at once, if it is to continue in prosperity. The strenght of a plant must eventually be measured—not by the quantity of power developed, nor by the number and size of its producing machines, but by the proper relationship of the annual requirements of wood, and the annual yield of the forest, that it controls.

Forest exploitation promises closed plants, impoverished communities and the destruction of an important National asset.

Forest perpetuation through conservative forest management insures the continuity of the mills resulting in prosperous communities and permanent enjoyment of a rich inheritance by the Nation.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C.N.R. CAR 6025
CANADIAN FORESTRY ASSOCIATION'S EXHIBIT CAR
VISITORS ALWAYS WELCOME
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THE WORSHIP OF TREES

(Article No. 2)

By Dr. C. D. Howe, Dean, Faculty of Forestry, University of Toronto.

The belief that tree spirits had an influence upon cultivated crops was by analogy transferred to domestic animals, and various kinds of trees were used to insure the increase of the herds. Relicts of this belief in a changed form still remain in country districts in both the British Isles and on the Continent where a green bough placed against the stable on May Day will cause the cows to increase in milk. It was believed by our remote ancestors and is still believed by many primitive races that the presence of a tree or bough, or some ceremony in connection with trees was necessary to bring children to the home. It may be, we reflect, a modified relict of this belief in our desire to have a rubber plant or a dwarf fir tree in the home or a boxwood tree on the verandah.

Some antiquarians believe that tree worship was only an accidental offshoot, as it were, of ancestor worship, a form of worship apparently almost universal in the early development of nearly all races. Frequent sacrifices of animals, often of human beings, were made on the barrows, cumuli, or other forms of burial places. It was also the custom to keep the spirits of departed ancestors well supplied with food. Naturally, those practices greatly increased the fertility of the soil in the immediate vicinity and this expressed itself in a more luxuriant vegetation. The primitive man reasoned that the more vigorous growth of the trees in such places was caused by the spirits of his ancestors entering them. Therefore he held them in great veneration, and also regarded the tree as an emblem of fertility and productiveness. From this conception he passed by easy stages to the belief that the presence of certain tress in his fields or that certain ceremonies and rites centering about trees would increase the productivity of his crops and herds. In fact, some investigaotrs believe that primitive man discovered the art of agriculture itself as a result of his ceremonies in ancestor worship. The burial of the dead and the victims of sacrifice resulted in the turning over of the sod and the stirring up of the soil. The native grains and fruits which he placed upon the burial ground as food for the spirits, germinated on the spot, grew vigorously and yielded an improved and more abundant harvest. Observing this, it occurred to some practical minded worshipper, keener than his fellows, to stir up the soil and plant seeds in other places than the burial mound, and thus began the cultivation of crops with all its far-reaching influence upon the development of the race.

THE MORNING COMETH.

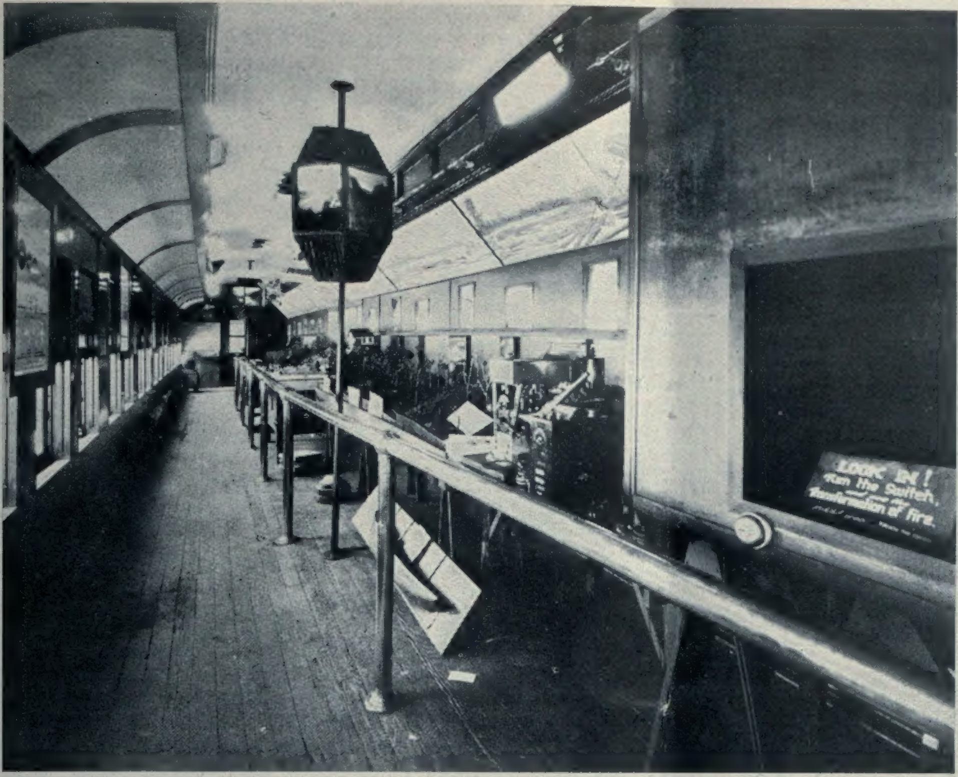
Henry Van Dyke.

Many a tree is found in the wood
And every tree for its use is good;
Some for the strength of the gnarled root,
Some for the sweetness of flower or fruit;
Some for the shelter against the storm,
And some to keep the hearth-stone warm;
Some for the roof and some for the beam,
And some for a boat to breast the stream;—
In the wealth of wood since the world began
The trees have offered their gifts to man.
But the glory of trees is more than their gifts;
'Tis a beautiful wonder of life that lifts,
From a wrinkled seed in an earth-bound clod,
A column, an arch, in the temple of God,
A pillar of power, a dome of delight,
A shrine of song, and a joy of sight!
Their roots are the nurses of rivers in birth;
Their leaves are alive with the breath of the earth;
They shelter the dwellings of man, and they bend
O'er his grave with the look of a loving friend.
I have camped in the whispering forest of pines,
I have slept in the shadow of olives and vines;
In the knee of an oak, at the foot of a palm
I have found good rest and slumber's balm,
And now, when the morning gilds the boughs
Of the vaulted elm at the door of my house,
I open the window and make salute;
"God bless thy branches and feed thy root!
Thou hast lived before, live after me,
Thou ancient, friendly, faithful tree."

The May-Pole Tradition.

At any rate, it seems quite certain that the prominent role of trees in the popular festivals of the European peasantry is an outcome of the belief in the blessings which the tree spirits had in their power to bestow. We have an illustration of this in the May Day festival or the mid-summer festival. Originally in these, and it still holds in many parts, it was the csutom to go into the woods, cut down a tree and bring it into the village amid general rejoicings. Later, these May-trees became simply May-poles. We have a quaint description of a May-pole celebration in the time of the good Queen Bess, from a Puritan writer who regarded such ceremonies as idolatrous. He says: "They have twentie or fourtie yoke of oxen, everyone having a sweet nosegaie of flowers tyed on the tippe of his hornes, and these oxen draw home this Mai-pole (this tinckying idoll rather), which is covered all over with flowers and hearbes, bounde rounde aboute with strynges from the top to the bottome, and sometime painted with variable colours, with two or three hundred men, women and children following it with great devotion. And being reared up with handerchiefs and flagges streamying on the toppe, they strawe the grounde about, binde greene boughes aboute it, set up sommer hauls, bowers and arbours hard bye it. Then fall they to banquet and feast, to leap and daunce about it as the heathen people did at the dedication of their idolles whereof this is a perfect patterne, or rather the Thynge itself."

As we have seen, the object of this ceremony was to bring in from the forest the renewing and fructifying spirit of vegetation newly awakened in the spring, so the pole was renewed each year. In course of time, however, the original meaning and significance of the custom was forgotten and the May-pole was regarded simply as a center for holiday merry-making. The people saw no necessity of felling a fresh tree every year, so they let the pole stand, only decking it with green boughs and fresh flowers on May Day. Later, the pole was taken down at the end of the ceremony and stored away until the next May Day, and finally the pole was not used at all, and is used today in the May festivals only in the more



A photograph showing one section of the Forest Exhibits Car of the Canadian Forestry Association, now travelling through New Brunswick and Nova Scotia with very large audiences at the daily exhibitions and the evening lectures. The Car is designed to impress in popular manner the value of the forest resources, and their relation to employment and provision of raw materials for all other of Canada's business activities. This enterprise has been called "a forest protection school on wheels." As many as three thousand people have visited it in one day, and the average attendance is from three to five hundred, according to the size of the community.

remote country districts. May-poles were forbidden by the Parliament of 1644, but came once more into favor at the Restoration, then to be set up in London in 1661, on or about the site of the presen tSt. Mary's-in-the-Strand. It is thought by some that our word "maple" is a contraction of the word May-pole. Although the tree may have been used as a May-pole on the continent, it probably was not used in England, for the only native maple there is a shrub. It is thought the birch was most commonly used in England for this purpose.

The Tree, A Spirit Home.

The next step in the evolution of the tree spirit is the giving it the human form. The spirit became a god among the ancient Greeks. Dionysius was at first simply the spirit of the vines and later of the mulberry tree. In time he became a god of these trees and by gradual transitions the god of the cereal crops, and finally of vegetation as a whole. His festivals were held on the 20th of March and on the 21st of December. On the spring equinox, with the resumption of vegetative activity, he was thanked for carrying the people through the winter and supplicated for good crops during the coming growing season. At the winter solstice he was thanked for good harvests and supplicated for as moderate a winter as possible.

Our remote ancestors, living at this time in a more northern and a more heavily forested region, and so not being particularly successful agriculturists, probably did not carry the tree spirit through so many transformations as did the Greeks, yet there is evidence that it did take human form, as is found in many folk-lore tales. In fact, we find in the Old Country a relict of this idea in the May Queen, May King, Leaf Man, Jack in the Green, where human beings are substituted for the May-tree and the May-pole. When the Queen o' the May makes the rounds of the village with her garlands of flowers, she is bestowing upon the households the blessings of the spirit, not of a tree, as in earlier customs, but the spirit of vegetation as a whole, although the Queen herself at the present time probably does not understand the historical significance of her act. At present in our own country, also, the personification of the tree spirit or of the spirit of vegetation is being lost, if not already lost. The ceremony exists with us apparently only in the desire to go a-maying, and that desire although felt by all of us is now seldom realized. One of the pleasantest recollections of my childhood is the going a-maying, and on return from the woods distributing our flowers among the aged and infirm of the village.

Various superstitions in regard to trees are offshoots of tree worship. They have been handed down to us through folk-lore and legend, but often with their origin forgotten and their significance modified or completely changed. Their persistence down through the distractions of

Continued on page 365

An Oak's Water-Raising Power

The average oak tree in its five active months evaporates about 28,000 gallons of water, an average of 187 gallons a day.

The world's forests are being so depleted that from Brazil comes the statement that reforestation of the eucalyptus tree is proposed. Five years suffice for the growth of the tree to a commercial size, and the expense is calculated at 3s. sterling per cubic metre of wood.

The cultivation of camphor is an important industry in Hiogo, Japan. Some of the larger and older trees have a diamter of 15 feet, and a reputed age of 300 years. About 50,000,000 lb. of camphor is sent out of Japan every year. One-fourth of this goes to the United States.

What a Forest Asset really means

What national forest estates mean to a country can be seen in the case of Germany, which has a net revenue from its State forests of £16,000,000. This, at 4 per cent., represents a capital of £400,000,000. To this national asset, bringing in a gross revenue of some £21,000,000,000, and a net revenue of £16,000,000, is partly due to the fact that Germany had before the war a national debt of only £270,000,000 against France's £1,300,000,000, and England's £600,000,000. France has lost a large part of its best State forests, and now has a forest revenue of only £500,000.

No countries have greater need of some substantial set-off against their national debts than the Australian States. I have quoted Germany here because the statistics are the best known.—A Discussion on Australian Forestry. (Hutchins).

Mature shelter belt underplanted densly

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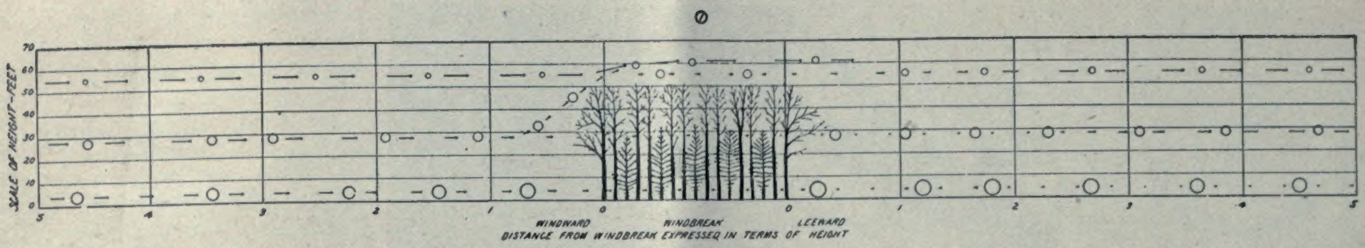

NARROW BELT NOT UNDERPLANTED OPEN BELOW

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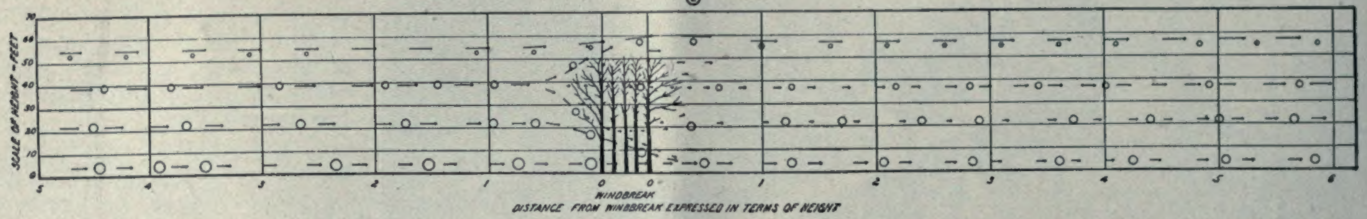


Showing the effect of two kinds of windbreak on air currents.—Velocity indicated bylength of arrows.—Humidity by diameters of circles.

Breaking the Power of Prairie Winds

By Carlos G. Bates, U.S. Forest Service

The windbreak directly reduces the mechanical force of winds and through this reduction has several other influences. The measurement of velocity of surface air curernts has been carried on chiefly in connection with studies of evaporation and is accomplished by the use of the standard anemometer, which expresses the wind velocity in miles per hour. As in the case of all other atmospheric measurements, the anemometer is set up at a height of 4 feet from the ground. One instrument, in a fully-exposed situation gives the normal wind velocity for a stated period, while at the same time other instruments exposed at certain points within the area influenced by the windbreak show comparable velocities. The distances from the windbreak are always even multiples of the height of the windbreak.

Evaporation

The ability of the windbreak to check evaporation must be its source of greatest benefit, since, in the region where windbreaks find their greatest usefulness moisture is almost always insufficient for the best interests of agriculture. To thoroughly understand the influence of a windbreak upon evaporation it should be stated that the evaporation of water from any wet surface and also the transpiration of moisture from the leaves of plants is accelerated by three conditions — heat, dryness of the air, and rapid air circulation. Hence, anything which reduces the movement of the air reduces the rate of evaporation and may effect an appreciable saving of the moisture supply.

Evaporation has been measured in a way which shows about the same effects of windbreak protection as are felt by the plants of a field crop. In other words, the evaporating surface of the instrument responds to the same influences as do the leaves of plants. The evaporometer consists of a circular sheet of filter paper resting on a thin glass plate and continually moistened by a supply of water which is fed onto the center of the paper. The moist paper is exposed to sunlight, and the circulation of the air above it is perfectly free, so that it responds readily to changes of temperature and to changes in wind velocity.

In this case, as in measuring wind, the normal evaporation for the period in question has always been obtained by exposing an evaporometer at a point where it could not be affected by the windbreak. Other evaporometers were similary exposed on both sides of the windbreak at distances from the windbreak which were one, two, and five times its height, and, in addition, on the leeward side at ten and twenty times the tree height. These distances practically cover the entire range of the windbreak's influence upon evaporation. The instruments show the quantity of water evaporated, and the amount evaporated in the open is taken as the normal, or 100 per cent. Amounts evaporated at other points are reduced to percentages of the normal.

Humidity

It has been assumed that the greatest effect of a windbreak upon the humidity of the air over grain fields arises not so much from the possibility of the trees adding to or detracting from the moisture content of the air as from their disturbing influence upon the movement and direction of air currents. To determine how great this effect might be the amount of moisture in the air at several points on both sides of the windbreak and at a height of 4 feet from the ground was determined in a single case by numerous and successive readings of the ordinary cog-psychrometer.

PRAIRIE COTTONWOOD TREES, 45 FEET HIGH.

Photograph taken near Raymond, Alberta. The trees are 18 years old, irrigated, and were planted by Herbert Cook in 1902 to shelter his home. The seedlings were obtained from the Dominion Forestry Branch, at Indian Head, Sask.

Flying Operations this Summer

The following operations are being undertaken by the Director of Flying Operations Branch of the Dominion Air Board

Vancouver, B. C.

Operations being undertaken for the Department of the Interior, Forestry Branch, consisting of forest fire protection, forest reconnaissance and photographic reconnaissance; forest reconnaissance to consist of the identification of species, location of timber, estimating the amount of timber in various localities; photographic reconnaissance to consist of the taking of photographs of certain areas, showing burnt and green areas, waterways, etc.

Forestry work is also being undertaken from this base on behalf of the B. C. Government, Department of Lands and Forests. It will consist of the same nature of work to be carried out for the Department of the Interior.

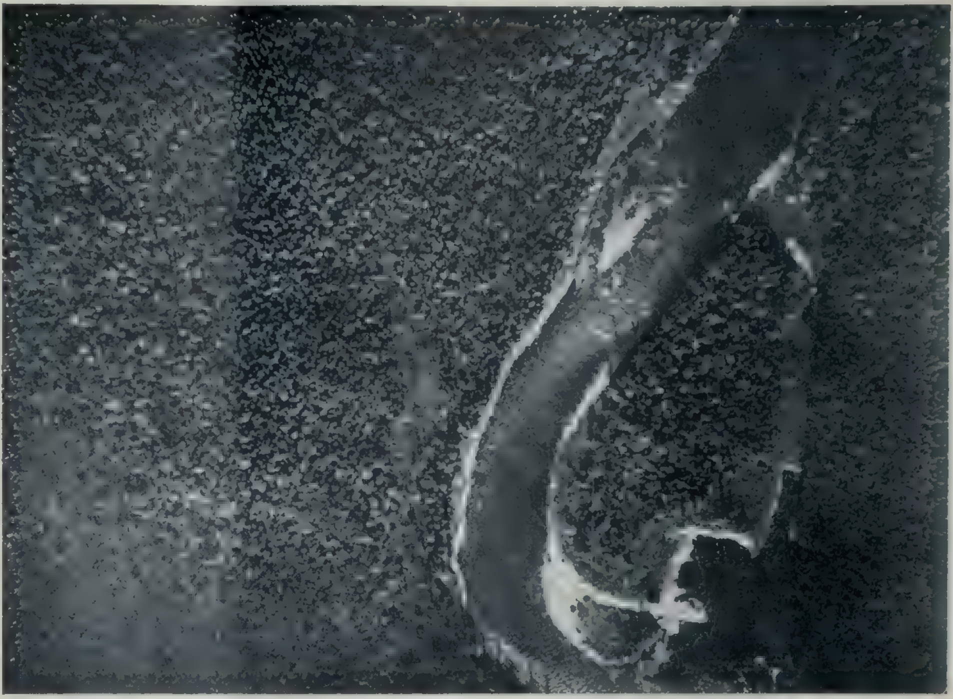
High River, Alberta

Work at this base is being undertaken for the Department of the Interior, Forestry Branch, patrolling the various reserves along the foothills of the Rockies, forest fire protection being the chief factor.

Experiments are to be carried out during the present summer with the wireless telephone, in this area. Wireless communication from machines to ground and vice versa will be established. Only a limited amount of photographic work will be undertaken.

Victoria Beach, Man.

A Station is being established at Victoria Beach, Manitoba, to undertake work for the Department of the Interior, Forestry Branch. The work will be divided equally between forest fire protection and photographic reconnaissance. It is proposed to construct a mosaic map of a portion of the forest east of Lake Winnipeg, 36 miles in width and 40 miles in breath.

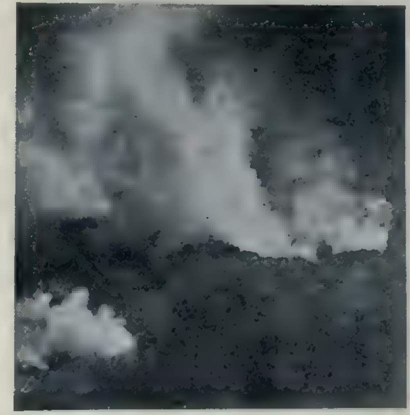


COUNTING OUR TIMBER WEALTH BY CAMERAS.
An aerial photograph taken recently by the Air Board showing a mixed coniferous and hardwood stand.

Northern Ontario

Work will be undertaken on behalf of the Ontario Government over the forest areas situated north and south of the Canadian National Transcontinental Railroad. Work will be commenced at Sioux Lookout. Representative strips of photographs will be taken on both sides of the transcontinental line at a distance of approximately 180 miles.

The unit will be mobile and on completion of the work at one spot, will be moved east about 150 miles to another suitable location. The country will be covered in this way from Sioux Lookout to Cochrane.



A developing forest fire as seen from an aeroplane. Photo by Laurentide Co. Air Service.

Forestry observers are to be carried and will sketch in the disposition of forests on each side of the representative photographic strips.

Roberval, P. Q., (Lake St. John)

Forest reconnaissance and photographic survey will be undertaken on behalf of the Quebec Provincial Government. A certain amount of work will also be done for the Department of the Interior, Forestry Branch, mostly of an experimental nature.

Part of the Air Station, constructed by the Laurentide Company, at Lac a la Tortue, Quebec, showing the machine shop, and the residence of the senior pilot.

HE WANTED TREES ON THE "BARE PRAIRIE" AND GOT THEM.

A progressive resident of Oxbow, Saskatchewan, who came to a treeless plain and changed it into "Home Sweet Home."

Transforming the Prairie

Oxbow, Sask., May 10, 1921.
Illustrated Can. Forestry Magazine,

Just a word of encouragement in your work, and I would say that I think you have a long hard row to hoe before you will get people interested to the extent of abandoning money grabbing in order to plant trees in a big way. But don't give up the ship, I think the salvation of this whole western country depends upon tree planting to a larger extent than anything the writer can think of. As a proof that tree planting can be carried on successfully, I am sending you by concurrent mail a photo of a private residence in Oxbow, and I can remember when this plot was as bare as your hand as far as shrubs and trees are concerned, and that is not so very long ago. I can remember when we came here in 1882, there wasn't a shrub of any kind from the Moose Mountain to the International Boundary. Prairie fires no doubt were responsible for this condition, and as soon as we got the system of fireguards, especially the native poplar, began to appear in the low places around the sloughs, and today, this entire country is like a park, that is, the greater sections of it, and I can see no earthly reason why our main roads should not be lined on each side of the road with trees, even if they were one hundred feet apart.

Any tree with life in it will grow if properly planted and taken care of as I myself have seen it proven in thousands of cases. All we need is push, and it will take a lot of it to get the people interested. The magazine is fine provided it reaches enough of the people.

Yours very truly,
T. W. BAIRD.

WHY KEEP THE PRAIRIE FOREVER BARE?

Mr. R. G. Mathews, of Macleod, Alberta, is the owner of this handsome place. The trees are not more than seventeen years old and were planted without irrigation.

"I CAN'T SPARE THE TIME."

By Archibald Mitchell.

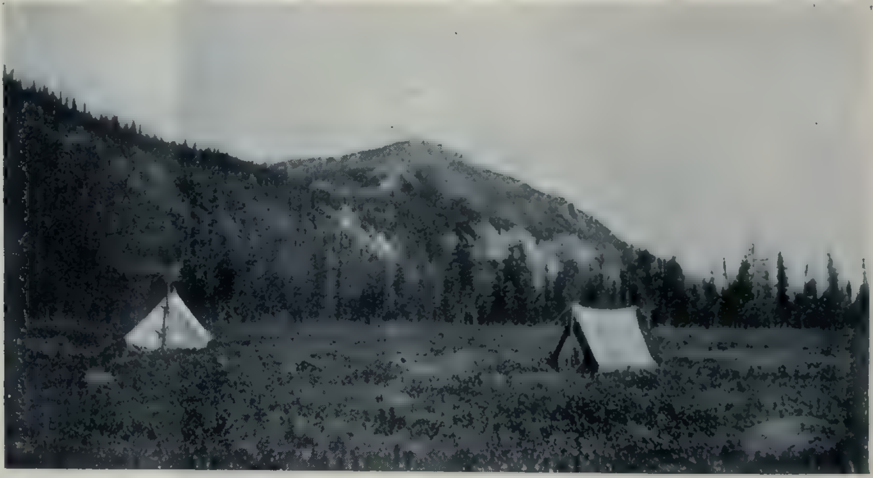
An acre of 1,800 trees 4'x6 planted by two men and a team in a day does not look such a terrible job, and three days switched out of the middle of seeding time on a prairie farm and tacked on to the end of it doesn't look so disastrous. "John Smith" and "Tom Brown" with similar fields, starting to seed on the same day and coming out at the end of the season with similar wheat yields apiece, but with "Smith" having a fine plantation in addition, and "Brown" with nothing else but the wheat, gives them a different slant on the proposition. "It looks different when you put it that way."

DRIFTWOOD ON THE MACKENZIE RIVER NEAR OLD FORT GOOD HOPE.

On Canada's Northern Boundary the derelict logs of Siberia, Norway and the St. Lawrence River find a common meeting place.

Mackenzie River Driftwood

By Dr. E. M. KINDLE,
Geological Survey of Canada



AREA KEPT FREE OF FOREST BY ICE ACTION. NORTHERN BANK OF THE GREAT BEAR RIVER ABOVE MT. CHARLES.

All explorers who have an acquaintance with the Arctic coasts of America are familiar with the driftwood which in many places encumbers the shore line. Along many parts of the Arctic coast of Alaska and Canada vast quantities of forest debris consisting largely of good-sized logs and trees are piled up on the beach where the adjacent land affords nothing in the shape of timber larger than the Arctic willow, which seldom grows higher than a man's head.

The "Fram" expedition collected 40 samples of the drift logs from the coasts of the Arctic Archipelago, and these have been determined by Dr. Ingvarson who recognizes three main sources for the wood. The first is the Yenisei and Lena Rivers of Siberia, the second is the St. Lawrence, and the third is the coast of Norway. The Mackenzie River is not mentioned. In the writer's opinion it is second only to the Siberian rivers as a source of Arctic coast driftwood, and he here records his own observations concerning it.

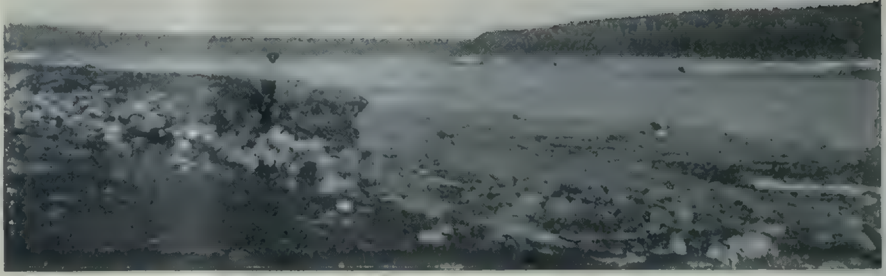
Driftwood on the Mackenzie

One might easily spend a single season on the Mackenzie, as the writer did in 1917, without learning that it furnished a very large amount of driftwood to the Arctic coast. During that season the driftwood seen consisted of occasional floating trees or widely deployed trains of forest debris. The "voyageur" sometimes utilizes one of the larger trees which still retains the branches, to make progress against an upriver wind. The deeply submerged branches cause the strong subsurface current to bear such a tree and any canoe which may be attached to it into the teeth of an upriver breeze as effectively as the underwater sail expedient, which is often resorted to when a floating tree is not available. Even in fair weather the floating tree is often made use of to save time for the "voyageur" on the Mackenzie. By lashing to a suitable tree he can cook his meals while proceeding on his way. If for any reason night travel seems desirable, the canoe may be secured to an Arctic-bound tree at bedtime and an undisturbed sleep obtained.

The relatively small amount of driftwood seen on the Mackenzie in 1917 is due to the fact that flood conditions did not occur on any of its tributaries that year, and though a great carrier of driftwood the Mackenzie is not itself a great producer. The writer has elsewhere remarked that the vast quantity of driftwood carried by the Slave and its tributaries ends its northward journey in Great Slave Lake. In the same place he has pointed out some of the contrasting features between the Mackenzie and such streams as the Peace and Athabasca Rivers which materially affect the relative amounts of driftwood produced by them. Because of the comparatively straight course and the frequency of boulder-paving the Mackenzie — except in the delta — takes from its own banks a relatively small toll of trees. By far the greater part of the driftwood which it bears to the Arctic Ocean comes from its western tributaries. Great Bear River, the only large eastern tributary, receives its crystal clear and very cold water from Great Bear Lake, which retains the driftwood as well as the silt which enters its basin.

Driftwood on the Great Bear

Like other subarctic streams the Great Bear River contributes from its own banks a small amount of driftwood during the spring break-up, as a result of the destructive grinding and uprooting power of the great volume of moving ice which is brought to bear locally on the river bank forests by ice jams. Immediately above Mt. Charles on the northern bank of the Great Bear is an area large enough for the maneuvering of an army which ice action keeps permanently free of forest growth. It is the result of rather special conditions. The channel is here relatively narrow and the water swift. Ice forms to a great depth on and near the banks because the river repeatedly breaks through and overflows the ice-coverted surface. The end of winter finds a great ice dam more than 30 feet thick built across the river just above Mt. Charles, a circumstance which makes the formation of an ice jam at this point an annual event. In 1919 as late as July 30 ice ramparts 20 to 30 feet thick were found bordering Great Bear River above Mt. Charles for more than a mile. These consisted not of the cemented blocks of jam ice but of ice which had formed in place — the ends of a great winter ice dam.



VIEW OF ICE RAMPARTS ON THE GREAT BEAR RIVER ABOVE MT. CHARLES, LOOKING UPSTREAM. THE RAMPART ON THE FAR SHORE HAS AN AVERAGE THICKNESS OF ABOUT 20 FEET.

Source of Mackenzie Driftwood

The Gravel, the Peele, and other large western tributaries of the Mackenzie doubtless carry notable quantities of driftwood into the main stream, but the great bulk comes from the Liard River. The timber growing on the banks of the Liard and its southern branches is about as large as that found on the Peace and Slave Rivers, and its driftwood includes many trees from one to two feet in diameter. The unusually high stage which the Liard reached in 1919 set afloat a vast quantity of stranded logs, many of which had started their northern journey in previous years. At the time the mouth of the Liard was passed on July 1, it was discharging very little driftwood. The vanguard of the main volume of the Liard driftwood reached Old Fort Good Hope on the lower Mackenzie about July 13. At that time the writer was using a canoe a short distance above the old fort and had an opportunity to get a clear conception of the great volume of the floating mass of trees, logs, limbs, and bark. The immense volume of this floating mass of travel-scarred tree trunks and forest debris greatly exceeded anything previously seen or imagined. In general it formed a nearly continuous mass a quarter of a mile or more in width. When, as frequently happened, the mass of drift spread out under the influence of a breeze or current which carried it toward the middle of the river the width often exceeded a miie Walking over this driftwood was often more feasible than canoeing through it. The closely packed phase of this particular exodus occupied about four days in passing a given point. Detached masses of small size and single, widely scattered logs followed it for several days. Spruce and poplar comprise the great bulk of the Mackenzie driftwood. Here indeed is a mammoth supply of pulpwood delivered at tidewater, cutting and transportation free, that merits the consideration of any enterprising paper company that can solve the commercial problem of transportation around thte Alaskan coast!

This vast contribution of driftwood eventually comes to rest chiefly on the coast of Arctic America and the islands west of Greenland. Frank Russell, traveling down the Mackenzie delta and along the coast to Herschel Island, remarked the immense quantities of driftwood brought down by the Mackenzie "strewn for hundreds of miles along the coast. . . The sand beaches of the coast are literally covered with the white trunks from which the bark and branches have been worn".

Other travelers have noted the large quantities of driftwood seen along the Arctic coast east of the Mackenzie, which is evidently its principal source. Dr. R. M. Anderson has informed the writer that he found it much more abundant on the western than on the eastern sides of projecting points along the shore east of the Mackenzie. On the coasts of Victoria Island and Banks Land seen by Dr. Anderson, driftwood was scarce as compared with the mainland. That it is distributed far and wide throughout the Arctic Archipelago, though less abundantly than on the mainland, there can be little doubt.

(Published by courtesy American Geographical Society.)

Lumber Resources of Canada

A census of the lumber industry, in Canada has been completed by the Dominion Bureau of Statistics, embracing 2,879 operating concerns, of which 52 were in Alberta, 251 in British Columbia, 29 in Manitoba, 255 in New Brunswick, 462 in Nova Scotia, 60 in Ontario, 60 in Prince Edward Island, 1,151 in Quebec in Quebec and 16 in Saskatchewan.

The total capital invested in the industry, including land, buildings and plant, machinery and tools, stocks in process and supplies and working capital is given as $149,266,019.

The number of employees on salaries was given as 2,874 males and 285 females, who received a total of $3,554.097. The average number of employees on wages was 25,516, engaged in logging operations and 28,820 in the mills, their combined wages amounting to $34,412,411.

The aggregate value of production in 1917 amounted to 115,884,905. The census covered 29 kinds of lumber, 11 of shingles, 10 of lath, 6 of pulpwood and 10 of miscellaneous products.

Ontario is estimated to have between 70 and 90 million acres covered with commercial saw lumber.

Quebec is estimated to have forest resources of 230 billion board feet, of differerent kinds of commercial saw timber and an additional 100 billion feet of pulpwood.

New Brunswick is estimated to have 17 million acres of commercial saw timber, estimated at 25 billion board feet.

Nova Scotia is estimated to have 15 million board feet.

In British Columbia, the area of merchantable timber land is estimated at 33 million acres. Saw timber is estimated at 350 billion feet and pulpwood at 366 billion feet.

The Prairie Provinces are estimated to have an area of 10,920,000 areas of forest and the merchantable saw timber is estimated at 41,850,000,000 board feet.

How Fast Do Trees Grow

One of the things most necessary to know in regard to Canadian forests is how rapidly they grow again, when cut down or burned over. Most of the European countries have this knowledge in fairly complete form and are managing their forests accordingly, but European figures cannot be applied to Canadian forests. Each country must make up its own growth-tables. Information on this subject is being gathered in different parts of Canada. One of these scientific studies of the rate of tree-growth is being made by the Forestry Branch of the Department of the Interior at Petawawa, Ontario, in the heart of hte Ottawa valley. Plots of different kinds of trees are set apart, and the rate of growth in these measured and recorded. The effect of thinning, trimming, and draining upon the growth is also studied, so that in a comparatively few years data will be available which will be of the greatest value in the management of Canadian forests and woodlands.

Trees for the Prairie Home—A Practical Plan

Winds, the One Disagreeable Feature of Prairie Life, are Easily Counteracted and Home Life Transformed — A Helpful Story by a Practical Expert.

By Archibald Mitchell,
Western Lecturer of the Canadian Forestry Association.

Of the necessity for trees about the home, it should not be necessary to write.

One has only to live even a few months on the Prairies to know how welcome a shelter is when the wind is blowing.

We are glad to see the Chinooks in the winter. We look upon them as a special blessing after a spell of 30 below, but they are all the better when you can enjoy the balmy weather they bring, behind the shelter of a well-arranged belt of trees.

And even in the summer; who does not know how disagreable it can be sometimes to go out, anywhere away from the shelter of the house, and be swept almost off one's feet by the sheer force of the wind.

Then there is the dust. In this country, as in all other dry countries, the dust like the poor, seems to be always with us; and yet, these trees stop a tremendous lot of dust. At least the smother from the neighbouring summer fallow never reaches the houses when there is a substantial shelter belt between it and the west wind.

And Temper and Nerves! There is no telling the difference a few trees make. No wonder some poor women get discouraged and, indeed, almost distracted, sometimes, when the wind comes sweeping down, the washing blows away, and everything goes wrong at once. Two or three days of steady high wind have an uncanny power to razzle ones nerves; there's no mistake about it.

And yet, one can get about quite comfortably in the lee of a good belt of trees whether it blows high or blows low.

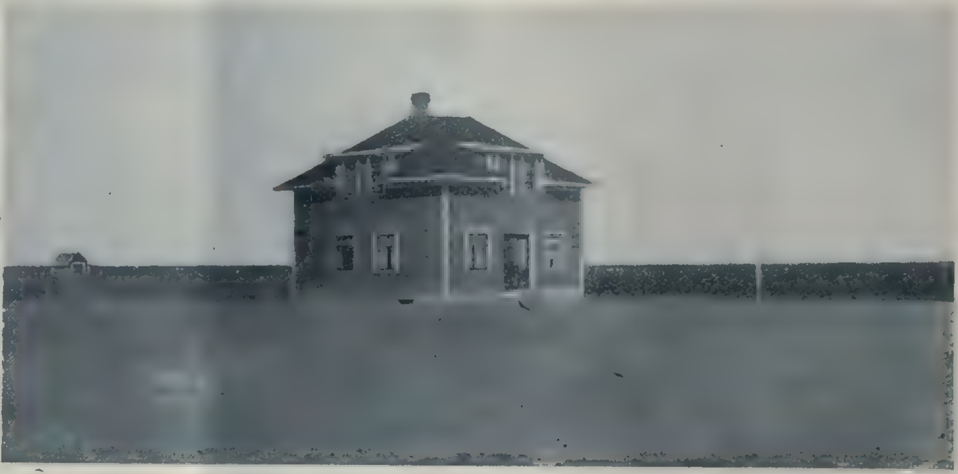
How often these days do we see mention of the optimism of the western farmer.

How, no matter how badly he is hit, he just launches out again and carries on, seemingly as full of optimism as ever.

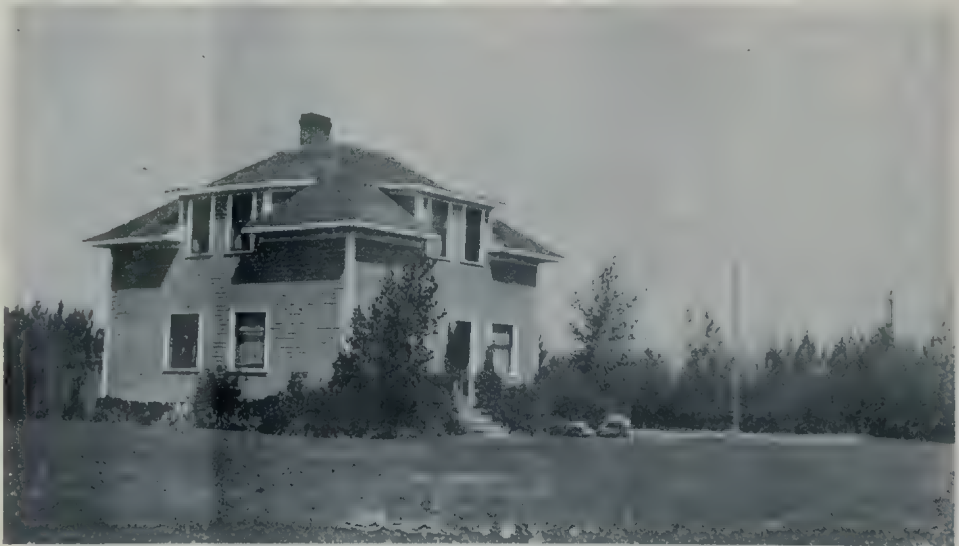
"This is going to be the banner year, the best yet" he says, and off he goes to prepare for another crop.

It is an optimist's country, and there is no doubt about it, we owe it in great measure to the fact of the sunshine.

It is a country of sunshine, and the bright, clear, sunshiny days one after another make it an ideal country to live in. Even in the winter this is so, for most of the bright, sunshiny days we get then would be highly enjoyable but for the one drawback, the wind. There is no getting away from it, the wind is a source of great discomfort, both in winter and summer, and surely it is only reasonable that the first thing one should think of when starting out on the Prairie is to do what one can to stop it by planting a few trees.



HE PRACTISES WHAT HE PREACHES.
Two photographs showing what trees can accomplish about a prairie home. The owner of this place is Mr. Archibald Mitchell, Western lecturer of the Canadian Forestry Association. Mr. Mitchell occupied the property at Coaldale, Alberta, in 1912, at which time the photograph of the unplanted homestead was taken.



After five years, the house and grounds are beautifully bordered with trees and shrubs.

Not that we will ever be able to stop the wind from blowing. We can never do that. But there is no reason why we should not have all the little local shelter we need for the house and farm buildings, if we want to.

Curious is'nt it, when one stops to think, the one all-the-year-round, disagreable, feature of our climate is the one we can most easily overcome. And we **can** overcome it effectually too if we just want to.

And fortunately for the Prairie, this is true on dry land as well as irrigated land. There is no trouble about the trees growing if they get a fair chance. Use the right methods and the right kinds of trees and there is no doubt of the result. They will grow.

When Starting to Plant.

When starting to plant, the first consideration is the main shelter belt around the whole group of farm buildings.

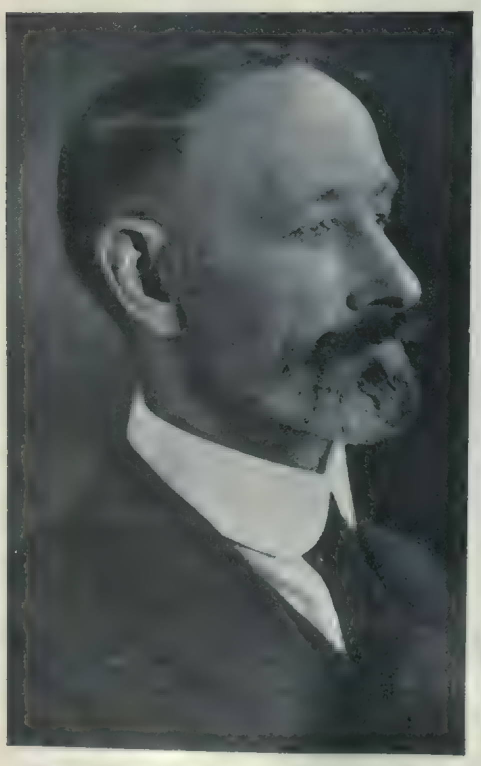
Everybody happy when a fertile prairie farm is enhanced by tree planting. This is John Glambeck's place at Milo, Alberta. The trees are planted only seven years ago. They are maples with a mixture of Caraganas.

This usually runs along the West, South and North sides, making three sides of a square. This enclosed space should be of good size to allow room for expansion in the future, for new buildings, hog and calf pastures, root ground, seed ground, garden and orchard, and so on, about 200 to 250 yards square is about right. Never mind if there is more land enclosed then you think you will use, the crop inside of the belt will be all the better for the shelter.

The shelter itself should be about 100 ft from the buildings to allow room for snow drift, and there should be two or three cross belts wherever they are needed to give complete shelter to any part of the enclosure.

The belt itself should be wide, 16 to 24 rows on dry land, and about 6 to 10 under irrigation. Tree growth is a matter of moisture and the greater width is required on dry farming to enable the plantation to keep its moisture from being dried out by the wind passing through it. Under irrigation we can supply water whenever it is needed and the only consideration is to provide enough trees for a shelter. Hence we can get along with fewer rows of trees.

The trees planted 4 feet apart in the rows, and the rows four feet apart will assure a good shelter in a very short time. If even only cuttings and plants twelve to eighteen inches high be used, the plantation will be 8 ft high in three years, and will be close and compact, already affording a good amount of shelter. In ten years there is no reason why the general level of the plantation should not be 25 to 35 feet high.



MR. ARCHIBALD MITCHELL, WESTERN LECTURER AND DEMONSTRATOR OF THE CANADIAN FORESTRY ASSOCIATION. MR. MITCHELL IS A PRACTICAL TREE PLANTER OF 30 YEARS EXPERIENCE, MOST OF WHICH HAS BEEN LIVED IN WESTERN CANADA.

Consider Your Home!

The house grounds should of course be inside the main belt but they should be apart from the rest of the enclosed space and different from it in its arrangement. The house itself should be fairly close to the shelterbelt, about 100 feet or so to allow for snow drift. If there is a snow trap (consisting of a double row of caragana 100 feet) outside the main belt, as there sometimes is, it may be nearer, for we must not forget the first consideration is shelter, and the closer the belt is in reason, the quicker its benefits will be realized.

The house, with its surroundings, is the most important spot on it. It is where the hope of the nation is to be brought up and it has a right to be different.

The lawn and its shrubbery will constitute the little Park of the place, the playground of the children, and, in its arrangement it should be as natural as we can make it.

Modern town planning demands lots of Parks, places different from the same old grind of street after street, and of such a nature that people entering find themselves in a different kind of world altogether. Instead of long lines of straight sidewalks and houses, they see groups of trees and shrubs with pleasant walks winding through and among them, and, dominating everything, beautiful expanses of well-kept green grass.

The Park is a complete change, and that is precisely the effect we want in the house grounds of our farm.

We want it to be our little Park, the place that differs from every other place, something in which to forget everything else, something to rest in, and something that is so attractive it makes us do so whether we want to or not. That is what we want in the home grounds of the farm.

Approaching the House

The house should have an entrance separate from the Farm yard entrance, and the drive should curve nicely up to it. There should be a turn round so that when our friends and neighbours come to see us they do not have to go into the farm yard or the cattle corral to turn their rigs or cars when they want to go home. The drive too should be convenient so that a wagon can get to the coal chute at the back door as well as the front one. Then the lawn should not be too large or the grass will never be cut. About 100 to 150 feet square, roughly, is about right. This means from half to one hour's work with the mover every week. No time at all when compared with the pleasure the lawn gives. Shrubbery should bound the lawn, and the borders of the shrubberies sould be sweeping curves, irregular and bold, enticing us to go round the shrub masses to see what is beyond. The shrubs arranged in groups of three or four of a kind, giving a mass effect, the tall ones at the back, the lower towards the front, with clumps of perennial flowers, the blues, the reds, the yellows, and the whites here and there, makes an artistic effect, which, once seen will never be forgotten, and one realized, will never be done without.

The middle of the lawn should be kept open, not cluttered up with flower plots and specimen trees. A wide open lawn is far the best.

Shrubs and flowers should be planted close to the base of the house to link up

TREE PLANTING ON THE PRAIRIES.
John Glambock, of Milo, Alberta, has attained splendid results in tree planting in five years time, as shown by the photograph. He is raising excellent fruits and vegetables, within the protecting zone of his tree belts.

the building with the ground and make it more natural and as if it really belonged there.

The View From Your Window

The turn round is usually planted, either wholely, or at least at the ends with clumps of bushes, and similar groups of shrubs should be placed in the hollows of the curves of the drive, the effect being to afford a reason for the drive taking the curve, an obstruction for it to go round, as it were.

The view from the windows too is important. From the windows, women get their outlook on the surrounding country and even if the houses face the west and the prevailing wind, there should be no solid shelter belt there to shut us out from looking around us. In such a case, a hedge of Caragana should be planted in front of the lawn and just inside that, a row of big trees about twelve feet or so apart. The hedge can be trimmed to about 4 or 5 feet and the trees to seven or eight of clean stem with big bushy tops. In this way, with the hedge below and the heavy tree tops above we can have a good deal of shelter on the lawn and at the same time our view is not unduly obstructed. The effect to the passing traveller is to enhance the beauty of the place by reason of the semi-screen afforded by the trees, the house just seeming to peep through the trees as one passes by.

So much for the ornamental part.

Then the chicken house should be convenient to the house, and so also must the clothes lines. It is a good arrangement to have part of the main shelter belt included in the poultry run. It makes a good scratching place for the hens and is cool and shady in hot weather. This can usually be arranged.

The other farm buildings will be arranged to suit, of course, and convenient to the house as possible and yet apart from it.

The Children Deserve It

These, then, are some of the features to be considered in laying out a farm home.

Usually there are some little attempts to plant a few trees and flowers round the farm home but there is seldom any real plan to work to and the result is often a good deal of expense and work with about half or less of the results possible for the same outlay when correct principles are followed. It is all a matter of information.. Most people want nice places, and everybody admires them when they see them. The trouble is so few are ever show nthe right way to set about getting them. If there is one thing the different rural organizations, the Community clubs, the Schools and so on should take up with vigor, it is this same matter of building worth while homes.

The children demand it; they have a right to nice, cosy, home surroundings; and the women deserve it.

"Time" ! Of course it takes time, and the men have little enough for their work usually, but a few days spent in fixing up the house and lawn will be well worth whil and the time will never be missed from the year's work if they will only make up their minds to it.

It is all largely a matter of making up your mind.

Fire Extinguishers

Many attempts have been made in the past to devise a fire extinguisher which could be used quickly to control small forest fires. Such attempts have failed mainly because no effective apparatus light enough to be easily carried by a warden was ever devised.

There is now however on the market an extinguisher in powder form which experience may prove to have a place in fighting forest fires. The material is known as "Firex" and numerous people interested in forest fire protection have seen it demonstrated as an extinguisher of fire. The powder thrown on a hot fire forms a gas which extinguishes fire with which it comes in contact.

Without doubt the powder could in many cases be used to deaden fires around snags or in slashings until more thorough suppression measures could be applied. It can be secured in small paper or tin-containers weighing filled about 1½ pounds, or if desired, in bulk. The material is not expensive, and it is believed worthy of trial.

"Forest Patrolman",
Portland, Ore.

A recent compilation of the Federal Forest Service shows that in the States of Montana, Idaho, Washington, Oregon and California total number of fires reported the years 1916-20 was 34,811 burning over an area of 6,635,697 acres and resulting in a loss of $13,641,020.00.

Built in April, 1921, by the New Brunswick Forest Service. This tower gives a thorough survey of 2,000 square miles in Victoria County.

"Fox Farming," A New Western Industry

By H. H. C. Anderson

In the development of the great Canadian West the quick money making schemes have been numerous and very varied. Coming under the legitimate class, none perhaps have proved more unique, in many ways, than the rapidly developing culture of furs to meet the tremendous demand of the fashionable world. The Western Provinces of the Dominion, following the start made in the industry in Prince Edward Island, were not slow to recognize the fact that Western Canada presented ideal conditions for the fostering of fur bearing animals; and at the present time, while not very extensive, the industry ranks as one of the best paying in Alberta, Saskatchewan or Manitoba.

Start with Wild Stock

When from the East came the tales of the wonderful prices paid for both furs and stock in the new ranching business, the Western farmer and capitalist were not slow to realize its importance or opportunities. They were soon in business for themselves. The scarcity of foxes prevents this new line introduced in many places, and the result was that the majority of the farms in the West were started by companies, with sufficient capital to buy good stock. The great tracts of country to the North of the three prairie provinces provides the sources from which the majority of the prized animals are bought, and many of them are now being kept in the West instead of being shipped East, as before. The alluring profits which continually loom up before the producers induce them to hold back from many present sales and the present time "holding" seems to be the policy of the business.

The never ceasing demand for the pelts of the silver, red and blue foxes keeps the prices so high that at the present time it takes a lay out of a small fortune to establish in the new business. The prices paid for single animals never drop below four figures, and a good pair will bring a very large amount. As high as $15,000 has been paid for a pair of silver foxes, which were judged to be as near perfect as possible. An Edmonton, Alberta, man living in the centre of the city captured a silver fox in his chicken coop, and at first believed it to be a dog. The next day he received an offer of $6,000.00 for the animal which turned out to be a perfect female specimen of the silver fox. Some idea of the value of the animals can be obtained by the figures which place the total worth of the foxes owned in Prince Edward Island at $10,000,000.

The Start of the Industry

Canada is now just winning back by artificial means a source of wealth which was lost by primitive extravagance. The great fur wealth, in what used to be the wilds, went unprotected at the mercy of the operations of the early fur traders.

As a consequence, the work of reclamation will prove a long, slow process. The culture of furs on business-like lines was started by Hon. Charles Dalton on Prince Edward Island in 1887. It has developed to such an extent that the island now practically controls the fox pelt supply of the world.

IT WOULD TAKE A FORTUNE TO BUY THEM.

Young silver foxes on a Western fox farm. A wild silver fox, caught in a trap, recently sold to a breeder for over six thousand dollars.

This pioneer experiment was first tried with a pair of foxes in a rough, old shed. The industry has developed along modern lines until the farm to-day represents a miniature hunting ground, where every care is taken ot keep the captives in as natural surroundings as possible.

Many of the latest fox farms are located on small islands. These locations are greatly favored by breeders. The inclosure is thus doubly isolated from the outside world, and the chances of trespassing become remote. The presence of water in a large body too, does much to make the conditions healthy for the animals, which at times prove extremely delicate.

A large number of blue foxes have been brought from Alaska breeding grounds to Canada. The majority of these animals went to the Maritime Provinces. The fact that the killing of seals is no longer permitted necessitated the owners to move them to the Pribilof Islands. These islands, with their numerous caves and natural shelters, made an ideal breeding ground; and the large quantity of seals killed every year made food plentiful. Since the regulations prohibiting the killing of seals went into effect it is made necessary to salt down meat to feed the foxes during the year. The blue foxes were sold to farmers for $800 per pair.

While in western Canada, the companies and individuals operating for farms have not been in the business for a sufficient length of time to warrant dividends of a sensational order, some of the Eastern companies are declaring dividends any where from 20 to 340 per cent. In capitalization the companies range from $20,000 to $200,000 owning from 2 to 20 pair of foxes. These profits are exceptional considering the short time that the companies have been in business; and the Western owners are looking forward to the same results.

A Fox Ranch near Calgary

One of the most successful farms in the West is situated at Midnapore, about ten miles from Calgary, Alberta, and was started by a group of Calgary business men. The farm has not been in operation very long, but already a good number of breeders have been collected. The enclosure, which consists of some forty acres, is situated on a creek and the land is well wooded. The owners are more than pleased with the success of the venture up to date and are contemplating additions to their present stock.

Spruce Budworm Injuries in Eastern Canada

By J. M. Swaine, Chief, Division of Forest Insects, Entomological Branch, Department of Agriculture

The Spruce Budworm outbreaks of recent years have caused an appalling havoc in the pulpwood forests of Quebec and New Brunswick and a recently discovered infestation is now spreading westward from Quebec into Northern Ontario. Balsam, spruce and hemlock have been injured by the budworm but the balsam has suffered much the most severely. Throughout the greater part of Quebec, south of the height of land, and in a large part of New Brunswick the balsam has actually been killed in amounts varying between fifteen and more than seventy-five per cent. Our surveys have not been complete enough to enable us to estimate the loss at all closely; but it is evident that, in Quebec Province, south of the height of land, we have lost at least one-quarter of the balsam above pole size during the last ten years, and that the loss has been quite as severe as this throughout large areas in New Brunswick. The spruce has suffered much less severely and probably very little of it was actually killed in Quebec Province by the budworm outbreak. Although the defoliation during the primary outbreak checked the growth of the spruce more or less completely, the trees usually survived the attack, and have largely recovered their normal appearance.

Dead and dying balsam trees following defoliation by the Spruce Budworm.
Photo by M. B. Dunn.

The Primary Budworm Injury

The spruce budworm is a small brownish caterpillar, affecting the foliage of balsam, spruce and hemlock in the extreme eastern part of Canada and the United States. At wide intervals the caterpillars develop in myriads and cause extensive and destructive outbreaks, lasting from three to four years in each section affected. The caterpillars feed chiefly upon the opening buds and young needles on the upper part of the crown, giving the affected trees a reddish or scorched appearance, by which they may be distinguished from a considerable distance. The adult state of the insect is a small yellowish-brown moth, which appears in mid-summer and, flying readily, distributes the injury, often with great rapidity.

Secondary Injuries

The primary spruce budworm injury weakens the trees by destroying the foliage year after year; but it is probable that the spruce, at least, would usually recover if the budworm injury were not supplemented by the attack of other insects. Balsam appears to be killed more easily than spruce by the primary defoliation. After one or two year's injury by the budworm both spruce and balsam are sufficiently weakened to be susceptible to attack by bark-boring beetles. These destructive insects lay their eggs in the bark of the weakened trees and the developing broods of grubs destroy the inner bark completely, killing the tree usually in one season. Probably most of balsam and all the spruce which has died in the budworm outbreaks in Quebec has actually been killed by this secondary bark-beetle attack, whether or not it would eventually have survived the attack by the budworm.

The weakened balsam is attacked by the Balsam Bark-beetle, Pityokteines sparsus Lec., and the Balsam Weevil, Pissodes dubius Rand.; the spruce by the Four-eyed Spruce Bark-beetle, Polygraphus rufipennis Ky., and the Destructive Eastern Spruce Bark-beetle, Dendroctonus piceaperda Hopk. The last is the most serious enemy of our eastern spruce and although a serious outbreak by it has not occurred during the last twenty years it may develop rapidly in the spruce weakened by the budworm. The Four-eyed Spruce Bark-beetle is already abundant in many locations in both Quebec and New Brunswick, but outbreaks caused by it are usually of minor importance and are less likely to spread rapidly in green timber. It is probable that this bark-beetle injury is spreading now in both Quebec and New Brunswick. The spruce and balsam dying in Quebce at the present time, excepting the Temiskaming district, is due chiefly to this cause and not to present attack by budworm.

Present Condition in Quebec

The recent Budworm outbreak in Quebec Province commenced in the region about Grand Lake Victoria about eleven years ago and spread rapidly throughout the rest of the Province south of the height of land, excepting the section north of the Saguenay River, and the extreme western border between lakes Abitibi and Temiskaming. The Budworm attack lasted about three years in each locality affected and then died away, leaving in its wake an immense quantity of dying and weakened balsam and of weakened but more hardy spruce.

An enormous amount of balsam died within two or three years after the attack, either as a direct result of the defoliation or from immediate attack by the Balsam Bark-beetle or the Balsam Bark Weevil. These two species of beetles bred abundantly in this weakened timber and a large part of the balsam which has died during the last few years in Quebec has been killed by them. The condition of the timber in Quebec last season indicated that, probably, throughout most of the Province, the greatest injury to balsam was past.

There will still be a heavy loss each year, through injury by bark-beetles and fungi, and our mature stands of balsam should be utilized before their greatest value has been destroyed. There is little danger of another budworm outbreak in the immediate future on the areas recently affected; the timber dying now will be mostly killed by bark-beetles. It should be safe now to leave balsam in Quebec Province as long as it remains in a healthy condition; but when many dying trees are found, indicating a rapid increase of bark-beetle injury, the whole balsam stand should be utliized as rapidly as possible.

It has already been stated that very little spruce died in Quebec as a result of the spruce budworm attack, and although bark-beetles have killed a considerable quantity of the budworm weakened spruce their injury has not yet become very serious. Nevertheless this injury should not be overlooked, and during the next few years any considerable amount of dying spruce in the East should be reported to us without delay so that control measures may be arranged for as soon as they are needed.

In the Temiskaming District of Quebec we have an active primary Spruce Budworm Outbreak spreading, as already mentioned, across the Interprovincial line into Ontario. It was discovered in the Long Lake section on the Quebec side of the line only last summer, and the injury has already been very severe. Many of the trees are already dead, killed by the bark-beetles, which are exceedingly abundant, and give the trees defoliated by the budworm little chance for recovery. Our ground and air surveys conducted last summer determined that the heaviest injury was still on the Quebec side of the line, but that the infestation extended as far west as Lake Temagami, with western margin of the outbreak reaching a line extending from the southern end of Lake Temiskaming through Lake Temagami and then north and east, recrossing the interprovincial line just south of the height of land. While the infestation is still light on the Ontario side of the line it may be expected to develop in severity this summer and to extend rapidly westward through the balsam and spruce stands, becoming most destructive where the percentage of balsam is highest. It has not yet gone far north of the height of land but will probably extend northward in stands carrying a high percentage of balsam. We hope to follow the course of the injury closely through ground and air surveys this season and to record the centres of heavy infestation and the changing boundaries of the outbreak.

White pine foliage was attacked by the caterpillars to a limited degree last season, but no serious injury to pine from this cause need be anticipated.

Present Conditions in New Brunswick

The Balsam has been very seriously depleted throughout the central part of New Brunswick by the effects of the Spruce Budworm defoliation and the Balsam Bark-beetle attack which followed it. A forest insect survey of this infested area now in progress under the direction of Mr. J. D. Tothill will be completed this season and it should then be possible to make a fairly close estimate of the loss that has been incurred.

The spruce was injured much less severely than the balsam and although on large areas the spruce was badly checked last year it is now probable that 90 per cent of this will recover unless, in its weakened condition, it is attacked by extensive bark-beetle outbreaks.

Possibilities of Control

We have not yet discovered any means of checking a primary budworm outbreak. With the balsam and spruce attacked by myriads of caterpillars, extending over thousands of square miles of territory, the outbreak spreads like a forest fire and no methods of control, feasible at the present time, will have any effect upon it. The Temiskaming outbreak covers a section more than 100 miles long and more than 30 miles wide. The young caterpillars have over-wintered in myriads, chiefly on the twigs of the balsam, over most of this area. When the buds open towards the end of May, the caterpillars will commence their destructive work, feeding upon the young foliage as fast as it develops. The injury could be checked only by destroying the greater part of these caterpillars. That could be done only by poisioning the caterpillars with arsenical sprays or dusts or by killing the infested trees and so starving the caterpillars before they could complete their development. Either of these methods could be employed effectively on a small isolated area; but when thousands of square miles are infested we can as yet only keep in touch with the progress of the infestation and record the rate and direction of its spread, so that the threatened timber may be salvaged in advance of the injury.

The injury to balsam and spruce caused by the budworm and insects which accompany and follow it has been studied closely by officers of this Branch in Quebec and New Brunswick during the last five years. An endeavour has been made to discover all factors affecting the development and subsidence of the outbreaks and the relations of succeeding secondary injuries. A detailed report on this investigation is being prepared.

It is evident that, throughout the course of these outbreaks, the heaviest injury has been to stands containing a high percentage of balsam, and, further, that the secondary injury by bark-beetles became increasingly abundant as the outbreaks developed and that it continued the destruction after the budworm disappeared.

It, therefore, follows that, considering the possibilities of a future budworm outbreak, the faster the balsam is removed from our mixed stands the safer it will be for our forest in the future; and, further, that the destruction of bark-beetle breeding grounds by burning the slash from balsam and spruce cuttings will have a decidedly beneficial effect upon the neighbouring forest.

Summary

It should be explained here again that the only active budworm outbreak now existant in Quebec Province is that in the Temiskaming district. Throughout all the rest of Quebec, with the possible exception of the north shore below the Saguenay, the spruce budworm has practically disappeared and we have now to deal only with the aftermath of its injury, chiefly bark-beetle attack in the weakened balsam and spruce. There is reason to believe that the most of this latter injury is past so far as the balsam is concerned, and the destruction of balsam slash will aid greatly in reducing future losses. There have been several rather severe local outbreaks of the Four-eyed Spruce Bark-beetle in spruce in Quebec during the last two years but none have yet proved of more than local importance. Bark-beetle outbreaks can be controlled effectively by modified lumbering operations, and if extensive loss should be threatened from this cause, we can recommend practical and effective means of control.

Fire Prevention Hints for Smokers.

Don't drop FIRE when you smoke in the woods, nor throw it out along the road. Keep the forests!

Matches, pipe coals, cigar stubs, and cigarette ends start many forest fires.

BE CAREFUL! Don't start a fire in the woods when you begin or end your smoke! Be sure your match, cigarette or pipe is out.

YOUR CO-OPERATION in order to keep down forest fires is asked. Break your match in two. Knock out your pipe ashes into your hand. Don't drop a burning cigarette.

FOREST FIRES cost millions a year. Don't start one.

Causes of Failure in Prairie Tree-Planting

It is safe to say that at least ninety per cent of the failures in tree-planting on the prairies are due to the fact that the importance of one or of all of three points has been overlooked. The three points are these:—

1. The soil must be most thoroughly prepared before planting;

2. Only such species of trees should be used as are known to be hardy in the district and suited to grow in the particular kind of soil and in the situation where it is desired to plant them;

3. A certain amount of cultivation of the soil after planting is absolutely necessary. This cultivation must be carried on until the trees are well established and able to grow without further care.—Norman M. Ross, Dominion Forestry Branch Nursery Station, Indian Head, Sask.

Handy Things to Know About Camp Fires

by W. N. Millar, Faculty of Forestry, Toronto.

Lengthy chapters, whole books indeed, have been written on the subject of camp fires. The camp fire has its place in song and story. It has been viewed from every conceivable angle and like other things that hark back to the days when man was newly on this earth, the normal reaction to the idea of the camp fire springs from memories deep-seated in human consciousness. But as a practical, everyday problem, the camp fire appears to the forester in two quite dissimilar guises. There is the camp fire he builds himself to boil his tea or fry his bacon or give him a welcome respite from the black flies or drive back the biting cold of the northern winter, and there is on the other hand, the camp fire the other fellow builds for just as necessary a purpose but which he only too often neglects to safe-guard and so gives rise to the forester's greatest enemy, the forest fire.

Thus we see that, as is so often the case, the camp fire can be both friend and foe. It is all a matter of the intelligence displayed in its use. No camp fire properly built, properly used and above all properly extinguished when no longer required for use, need give the slightest concern to anyone. But every camp fire in the forest during the summer contains potentialities of the most dangerous sort and as such should be handled with due care and regard for the possibilities involved. To the experienced woodsmen those facts are trite. But all builders of camp fires are not experienced woodsmen. Therefore many things need to be mentioned in discussing the building of camp fires that to the woodsman seem obvious.

A Home-Made Match Box.

For instance, camp fire building requires an adequate supply of matches well insured against moisture if the trip is to be a lengthy one and many fires are to be lighted. If the whole supply cannot be carried on the person a suitable receptacle for the extra supply should be provided and matches placed in it at the start. For this purpose an ordinary friction top can is excellent.

To carry matches on the person, many forms of match boxes are available but very few have the properties of strength, simplicity and water-tightness that the woodsman's matchbox must possess. A ten guage brass shotgun shell will neatly chamber a similar twelve guage shell and furnish a matchbox that for strength and simplicity cannot be excelled and which is as perfectly watertight as a pocket matchbox needs to be for any service.

Where to Build Your Fire.

Another preliminary to proper camp fire building is a knowledge of what is and what is not a suitable camp fire site. Often, indeed, one has small choice. The necessities of camp location involved in the finding in reasonably close proximity of wood, water and forage in the mountains or of wood and a level dry surface of sufficient extent in the canoe countries only too often make necessary the placing of the fire in none too handy a spot. But the real woodsman will always show his appreciation of true forest etiquette by sacrificing convenience to safety and will never build his camp fire in a dangerous place. For instance, it is often convenient to start the fire against a rotten windfall. Don't do it! Fire can hold over in rotten logs, giving no sign of its presence for weeks, only to burst out in a dry windy day and cause trouble. Often a bit of the forest floor is invitingly smooth because it is thickly blanketed with a layer of "duff." Don't build a fire on this either! It will be found extremely difficult to put out. Sometimes

HUNDREDS OF DEVASTATING FOREST FIRES BEGIN AS NEGLECTED COOKING FIRES

A DAY AT CAMPFIRE

A Song of the Campfire Club of America

A Godsend to the lover of good fellowship and the joys of sweet communion with Dame Nature.

Where the full moon shines by night over the glistening silver path across the lake, broken only by the silent, drifting, shadowy canoe.

Where the bright sun warms the crispness of the mountain air.

Where the ear can be attuned to Nature's harmonies and you can sit in the forest with only the wild folk for your companions.

Cares of the mind and a troubled spirit fade away as you enter the cleft in the rocks, which forms a gateway to this earthly paradise.

An emotion of joy rises in the breast and a flood of happy memories rushes through your mind at the sight of the curling smoke from the campfire, and as the lurking scent of good things for the inner man are wafted to you on the breeze.

Renewed in spirit, clear vision, refreshed in mind and body, you return to take up your work in the world while your thoughts are full of anticipation of another Campfire day and your heart is full of gratitude for a heavenly blessing.

a standing, green tree affords a tempting spot at its base for a fire place. Don't use it! Even at a distance of several feet the inner bark may be scorched and weeks afterward a bad fire scar is seen to have formed. Very often rocky points invite the caonoeist because they are sunny, windswept, free from flies and brush. Use them cautiously. Generally they are carpeted with a thin layer of moss, highly inflamable. A sudden puff of wind, a spark ignites the nearby moss, and, unless there is an immediate extinguishment of the fire, trouble ensues.

Keep Safety Foremost.

In selecting the place for your fire take first the old fire place if there is one. Quite often this is the case in any but the most remote or infrequently travelled regions. If the camp has been pitched on an entirely virgin site, pick a spot for the fire in proximity to the water rather than the tent. Select a level spot free of brush, rocks or windfalls so that one can move freely around the fire. Remember if you use a reflector that it is a fiendish device unless set on a clear level surface and approachable from behind and not directly in line of the smoke from the fire. On the other hand, when the flies are bad, the camp fire smoke is quite welcome about the tent. Don't forget that.

For special purposes, special devices and locations are desirable. It is not possible to describe them here. In general, however, the fire should be built only on rock or mineral soil and all inflammable materials cleared away from around it for five feet or more. Usually, this can be done safely after the fire is built by pushing the adjacent litter into the fire. The main point is not to neglect this precaution. So much for safety in fire location.

What Woods to Choose

The first operation, after the site is selected, is the securing of wood and kindling. No kindling equals the bark of the paper birch. Wherever it is found, the problem of starting a fire in any weather is solved. Next to the birch bark, the fat resinous woods that may be chopped out of blazes or big scars at the base of jack or lodgepole or bull pines is the most efficient kindling. Throughout the western mountain forests, small groves of trees specially barked by the Indians to produce such kindling usually mark excellent camp grounds and are readily available. Where none of these are to be had, the dry lower branches of pine, cedar or in fact almost any evergreen tree will suffice. All such kindling should be used the same way. With the knife, cut shavings in three or four pieces of dry branch or split wood but the shavings remain attached to the wood. Place these close together with the bunches of shavings in contact to serve as the starting point for the fire.

Stacking the Fuel.

The choice of fuel and subsequent arrangement on the fire after the kindling is placed is governed by a few simple but often neglected principles—These are briefly:—

1. Use as dry wood as possible.
2. Grade the pieces up in size, using the smaller branches near the kindling and gradually increasing the size.
3. Place all fuel compactly so that there is intimate contact between the pieces.

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The inexperienced camp fire builder can accomplish this work readily by arranging the wood in courses at right angles to each other. The experienced woodsman, however, seldom uses this expedient but merely grades his fuel properly and makes sure his wood is dry and compactly placed before touching off the fire.

Dry Wood in Rainy Districts.

A word may be said here about the selection of dry wood. Except during or immediately after a rain or in a locality where frequent camping has depleted the supply of dead wood, no difficulty need be encountered in securing dry wood if instead of picking up wood that is in contact with the ground, the precaution is taken of breaking off dead branches from standing trees or selecting from fallen trees wood that has been held above the ground. Such wood may be broken off with the bare hands or cut with a small hatchet. Where a full sized axe is available, material of any suitable size may be cut. It then becomes desirable to select trees according to their value as fuel, with due regard to soundness and dryness. Dry, standing dead trees are much more satisfactory than fallen timber. After heavy or long continued rains it often becomes very difficult to find fuel dry enough to burn. Recourse must then be had to the underside of dry leaning stubs or if only fallen timber is available, the under side of the largest trees must be selected. The author once travelled for seven weeks in a region where rain occurred daily. Long before the end of that period it became necessary to locate camps primarily on account of the availability of extra large deadfalls, on the under side of which it was alone possible to secure dry fuel. Such a condition is encountered very rarely.

Green Aspen for Winter.

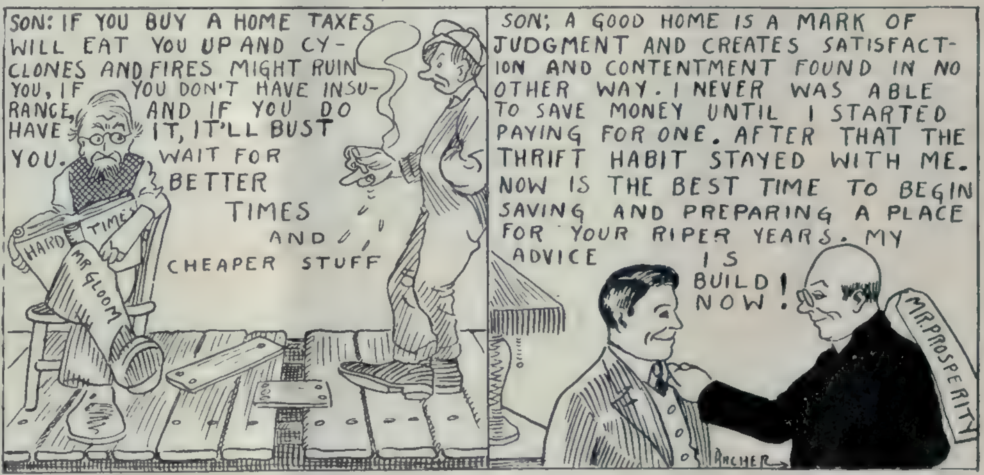
During the winter, however, it is more difficult to distinguish dry from wet wood than in summer. In periods of extreme cold more than ordinary care must be taken to select sheltered parts of standing trees. After the fire is well started, either winter or summer, green or wet fuel may be used in considerable quantity and it is generally advantageous to cut all large fuel, for large fires, twice as long as required and burn the pieces in two "chunking up" the fire from time to time. Where it is desired to maintain a fire for a long time, as over night, for instance, green fuel is generally preferable to dry. Green aspen is excellent for this purpose and although the process of burning it is often referred to as "stewing green poplar" the results are quite satisfactory.

Using the "Squaw Stick".

The most common sort of camp fire employed is one used primarily for cooking purposes. These vary all the way from a small blaze made with a mere handful of dry sticks to boil a kettle of water for noon tea, to cooking fires at permanent camps where various additional cooking operations such as baking, frying, broiling, etc., are conducted. Such fires are provided with suitable accessories for holding utensils which it is not possible to describe here. Also they are usually fairly well safeguarded. The dangerous fires are the small ones built for only temporary use, noon lunch fires especially. The only accessory equipment of such fires is generally the support for a single kettle, commonly a "squaw stick" driven on a slant into the earth and inclined over the fire with a weight, if needed to hold down the end and a block under it to keep it at a suitable height above the fire.

Method of Making Camp.

Nothing has yet been said about when to light the fire. The natural tendency in making camp seems to be to first build a big fire and then go about the rest of the work. To those campers to whom the cheerful ruddy glow of the fire is an essenital to a feeling of comfort and to whom this cheer seems to justify the work involved in cutting wood and keeping up a fire that is not being used, the "start-the-fire-first" method of making camp is, of course, the proper one. But this is not the necessary


SON: IF YOU BUY A HOME TAXES WILL EAT YOU UP AND CYCLONES AND FIRES MIGHT RUIN YOU, IF YOU DON'T HAVE INSURANCE, AND IF YOU DO HAVE IT, IT'LL BUST YOU. WAIT FOR BETTER TIMES AND CHEAPER STUFF
HARD TIMES
MR GLOOM
SON; A GOOD HOME IS A MARK OF JUDGMENT AND CREATES SATISFACTION AND CONTENTMENT FOUND IN NO OTHER WAY. I NEVER WAS ABLE TO SAVE MONEY UNTIL I STARTED PAYING FOR ONE. AFTER THAT THE THRIFT HABIT STAYED WITH ME. NOW IS THE BEST TIME TO BEGIN SAVING AND PREPARING A PLACE FOR YOUR RIPER YEARS. MY ADVICE IS BUILD! NOW!
MR. PROSPERITY
ARCHER

Which of the Two Fathers Is Giving the Better Advice?

"A little good stock"

The cookery books tell people to use it; and you know what a difference it makes to the tastiness of a soup, a stew, a hash, or a meat pie. But in summer stock is such a trouble to make. It is far better to use Bovril. Bovril gives the dish a delicious flavour.

And there is more real *goodness* in Bovril than in the richest stock or gravy. *Bovril has a body-building power of from 10 to 20 times the amount taken.*

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procedure. Where economy of effort is desired, the proper procedure on making camp is first to secure and stack ready for use sufficient wood to provide for the supper fire and kindling for breakfast as well. Then put up the tents, make the beds, build the fire place, fill the kettles, peel the potatoes, slice the bacon and do any other preparatory operations. When all the preliminaries are complete and the kettles hung over the properly arranged fuel and kindling, then and not till then should the match be applied. Thus no fuel is used that does not contribute heat directly to the process of meal preparation and the camper who is accustomed to starting the fire as the first operation in making camp will be astonished to find how little fuel is really needed for cooking purposes alone.

When it is desired to keep up the fire after cooking is completed no difficulty as a rule will be found in securing an adequate fuel supply even after nightfall. Such a fire is generally only for purposes of warmth or to serve as a centre around which the crowd gathers to continue the never-failing game of trying to outlie one another and the most readily procurable fuel may be used—size, shape, kind or even dryness is unimportant. Pick up whatever is handy. That's a good way to clear away trash from around your camp fire and improve both the safety and convenience of the site.

And Then—A Precaution!

Finally, the all important question of extinguishment must be mentioned. It is right here that most troubles arise and the noon camp fire is the worst offender. At permanent camps there is generally someone around to prevent the fire escaping and in a very short time a space sufficiently large to ensure complete safety is burned clear around a well guarded camp fire. But noon camps, lunch camps on portage trails, small fires built for smudges, little trail side fires of all kinds built only for temporary use, these are the ones most often left unextinguished by the careless, thoughtless traveller and from these the forest stands in greatest danger. There is really no excuse for such negligence. Few people build fires in the woods except to boil water over them. "Dry Camps" are not unknown but the author never found them attaining any degree of popularity. Water is a requisite at every camp, even the short pause at lunch time and water will thoroughly extinguish any campfire if applied as it should be. It makes no difference where the fire has been built. Every forester who has fought forest fires can tell stories of camp fires safe-guarded by the most painstaking precautions which, when left unextinguished and unwatched, gave rise to forest fires. The one unfailing method is to thoroughly drown out the fire with water. Don't be content with throwing on a cupful or two and damping down the blaze. Put out every last spark. If near open water, the simplest way is to throw all unburnt brands into the stream or lake. The ashes can be spread out thin and well soaked down till all fumes cease to rise. If in doubt, test with the hand. Whenever the coals feel at all warm, apply more water. This is not as formidable as it sounds. Two or three minutes work well directed will suffice, and the satisfaction of making a thorough job of one of the forest's worst enemies should repay every real woodsman for such effort.

It does, if he IS real.

W. N. M.

The city of Moosejaw has planted this spring 28,000 trees and shrubs. In Central Park the holes for the trees were dynamited to make certain of a moisture supply.

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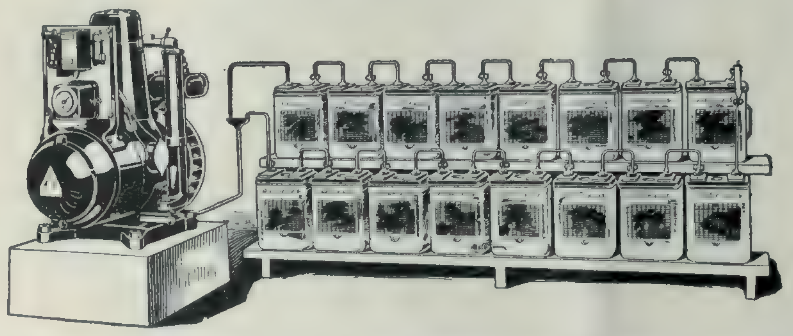

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Treeless Barrens That Come to Life

Mr. Freeman Tupper, Forester of the McLeod Pulp and Paper Company, who has written interestingly for this magazine on the rapid recovery of many of the barrens of Nova Scotia, has been asked by some of his readers why the new forests have only recently commenced to grow. "Why didn't they grow before? Why is Nature reseeding portions of our barrens now after so many years of waste?"

In artificial reforestation, it is considered a good time to seed or plant immediately after a burn. The soil is free of surface vegetation, and the light ash aids in seed germination. Care is then taken to plant at the proper time, and guard against adverse conditions, such as soil erosion and frost. Nature, however, does not work as quickly. Conditions soon arise which hinder seed germination, and thus many years pass before she again restocks the forests.

The prime factors of natural reforestation are source of seed, and preparation of the soil.

The seed of all our coniferous trees comes from the cone, or fruit of the tree. In the autumn, after the cone becomes thoroughly dry, it opens and allows the wind to blow the seed hither and thither. Some species are so formed with wings that they are carried a considerable distance. These seeds germinate and become trees, providing the soil in which they fall is right. The next question is: If our forests were swept away years ago by fire, where are we going to look for seed bearing trees.

Go where you will in Nova Scotia, especially on the Atlantic slope, and one will find thousands of bogs and swamps. Many of the swamps, and sometimes on the edges of the bogs, contain a stand of timber, which did not burn owing to the extreme dampness. We find seed bearing trees among them, and these bogs and swamps are situated in and about the burned areas. Again, on many barren lands, noticeably on the Liverpool River watershed, there are numbers of large white pines of high canopy. The bark being thick and corky, resisted the heat and escaped destruction. Near the butt they were charred, it is true, but they have recovered, and after fifty years of growth it is hard to see the marks. They are now excellent seed bearing trees. Younger trees are also found here and there over the barrens, whose age dates back to a year or two after the burn. They obviously spring from seed trees in the neighboring swamps. Being the exception rather than the rule, they, withstood the adverse conditions, and are large enough now to be seed bearing.

Ask the Canadian Pacific about Canada
CANADIAN PACIFIC RAILWAY

BUREAU OF CANADIAN INFORMATION

The Canadian Pacific Railway has established a Bureau of Canadian Information as a branch of its Department of Colonization and Development, with the object of disseminating reliable and up-to-date information as to agricultural and industrial openings in all parts of Canada.

WESTERN CANADA FARM LANDS

The Company has yet for sale several million acres of choice farm lands in Western Canada, at low prices and on long terms of payment. In certain districts lands will be sold without settlement restrictions, but the Company is prepared to grant special concessions to those who will settle upon and develop their farms.

IRRIGATED FARM LANDS

In its irrigation districts in Alberta, the Company has irrigated lands for sale at reasonable prices and on terms extending over twenty years. Under certain conditions, loans for improvements will be granted purchasers of irrigated lands in amounts up to two thousand dollars, to be repaid with land instalments.

EASTERN CANADA FARM LANDS

Lists of selected improved farms, available for settlement in Ontario, Quebec and the Maritime Provinces, with the names and addresses of their owners, may be obtained on application at any office of the Department.

INDUSTRIAL INVESTIGATION AND RESEARCH

Investigations, looking to the utilization of undeveloped natural resources and waste products and new industrial processes, are being carried on by the Research Section of the Department. Inquiries as to promising fields for investigation in this connection are invited.

INDUSTRIAL OPENINGS

Reliable information as to sites for new industries in all parts of Canada, and of special business openings in the growing tows and cities along the lines of the Canadian Pacific Railway in both Eastern and Western Canada, will be gladly furnished on request.

CANADIAN INTELLIGENCE SERVICE

Well equipped Canadian reference libraries have been established by the Department at Montreal, New York, Chicago, and London, England. These libraries contain the fullest information on all matters relating to Canada and her undeveloped resources, and are kept supplied with the latest information pertaining to new developments through the medium of a news service organized through the co-operation of the other departments of the Company's service. The information on hand in these libraries is available without charge to those interested, and inquiries addressed to any office of the Department will receive prompt attention.

DEPARTMENT OF COLONIZATION AND DEVELOPMENT
CANADIAN PACIFIC RAILWAY

MONTREAL: C.P.R. Bureau of Canadian Information, 335 Windsor St. Station.
WINNIPEG: J. F. Sweeting, Industrial Agent, C.P.R. Depot.
CALGARY: M. E. Thornton, Supt. U.S. Agencies, Dept. of Natural Resources Building.
NEW YORK: C.P.R. Bureau of Canadian Information, Wilson Building, 1270 Broadway.
CHICAGO: C.P.R. Bureau of Canadian Information, 163 East Ontario Street.
LONDON: A. E. Moore, Manager, 62-65 Charing Cross.

E. G. WHITE,
Superintendent,
MONTREAL, Que.

J. S. DENNIS,
Chief Commissioner,
MONTREAL, Que.

So that today the young forest which is springing up can be directly traced to these three sources of seed bearing, or parent, trees.

Of course a great deal depends upon the condition of the soil in which the seed must germinate. The soil under a stand of timber is chemically different than that of the barrens. The fire destroys the humus content, and if not planted immediately it is exposed to the wind and sun so that the surface layer loses water content or moisture; it cracks open and becomes hard. Water from the rains does not gradually sink in, but runs freely over it, causing floods, soil erosion, and then excess drought. This affects the flow of our rivers, and sometimes on steep hill-sides the soil is washed away so that it will never produce another stand of trees.

The next thing that happens is the springing up of a dense growth of scrubby bushes, alders, wire birches, and other hardwoods. These seeds, many of which have been on the ground in a latent state, germinate under most any condition, and grow very rapidly. These, then, are the adverse conditions to our coniferous species. To repeat, the seeds are either washed away, killed by drought, or frost, or choked by the thick surface vegetation. These conditions continue for a number of years, then comes the turning point. Conditions begin to improve; the broad-leaf species, or hardwoods, grow to be trees, which form a protection of the soil surface. The water content is again retained, and the rank growth of shrubs begins to die out. This, of course, requires a set of years to perform the work, but nature works in her own time and ultimately the soil is again made fertile to receive the seed of a new forest. The over-wood of hardwoods form a protection for the young seedlings, and they grow to be vigorous trees. Many of the hardwood will eventually die out as the new trees overshadow them, and as the years go by our heritage will again return to us.

Just one careless match, campfire, or tobacco ash, and nature's work of years has all been in vain. It is a shame of course, but we will not pity nature. We are the ones who suffer. It affects the social and industrial conditions of our whole nation. Our forest is our supreme industry. France realized this fact, and now the loss by fire in the forests of that country is only .0002 of its area.

TEN RULES.

For the Preservation of Our Forests.

1. Never start a large fire in or near timber any time during the fire season of spring or fall.
2. Never leave any fire entirely unwatched, no matter how safe it seems or for how short a time.
3. Never light a match without putting it out.
4. Never throw cigar or cigarette butts, or pipe ashes in dry leaves.
5. Never make an open fire without cleaning off all the inflammable material in a space at least 10 feet in diameter.
6. Never build a fire against a tree —live or dead—or against a log.

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Minerals. Practical information on the mineral resources of Canada, and opportunities for development.

Intelligence Service. The Industrial and Resources Department of the Canadian National Railways has the widest range of information on Canada, and which is available to the public.

Correspondence is invited from manufacturers, mining men, trade representatives, chemical engineers and others desiring information on Canadian conditions, resources, and industrial opportunities.

R. C. W. LETT, General Agent,
EDMONTON, ALTA.

J. WARDROP, General Agent,
WINNIPEG, MAN.

C. PRICE GREEN.
Commissioner.
Industrial and Resources Dept.
TORONTO

The National Way

7. Know the name of every Forest Ranger in your section and how to reach him quickly.
8. Feel a responsibility for every forest fire you see, no matter whether you started it or not.
9. Try to get it out yourself, but if beyond your control,
10. Get word to the Forest Ranger at once.

PRAIRIE TREES AND DRY YEARS.

By Archibald Mitchell

The familiar "Trees won't grow in dry years" was emphatically discounted by a visit to Doctor McCallum's farm at New Dayton, Alberta, where we found the Doctor just in from the seeder and glorying in his "bush." Planted in 1916 and '17, his trees are a splendid contradiction to the usual camouflage, and when you tell people you saw trees there, eleven to twelve feet high, planted in 1917, and some of which had made growths of four and a half feet last year, without irrigation, the objectors have no more to say. The concrete fact is something they can't get over.

How to save white pine from blister rust.

By S. B. Detweiler, U. S. Forest Service

White pine blister rust can be controlled by uprooting currant and gooseberry bushes. A diseased pine cannot directly infect another pine. The spores formed on a diseased pine produce infection only on currant and gooseberry bushes. Here the disease passes through two stages on the leaves. In the first stage it spreads from bush to bush. In the second stage it produces spores that cause blister rust infection in white (five-leaved) pines. The blister rust is absolutely and entirely dependent upon currants and gooseberries for its spread. Since these bushes are the only "carriers", their destruction is the primary basis of controlling this disease. This prevents further infection of the adjacent pines. Wild currant and gooseberry bushes are commonly present in white pine areas, in addition to cultivated bushes.

The spores which infect the pines have a very short life. They are so delicate that most of them perish within a short distance from the currant or gooseberry bush on which they are formed. A distance of 200 to 300 yards between white pines and the nearest currant or gooseberry bushes is sufficient to protect the trees under ordinary

At Woodstock, N.B., June 1st, five citizens of Perth appeared before a local Justice and pleaded guilty to a charge of having failed to extinguish their camp fire when on a fishing trip on May 13th, in a finely wooded section of the province.

A fine of $50 was imposed on each man, in addition to the cost of extinguishing the fire. Only the prompt action of Forest Service men stopped a disastrous fire which might have had serious consequences for many industries and for the Province as owner of most of the timberlands.

This is the first case of a fisherman in New Brunswick being punished for failing to extinguish his camp fire.

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conditions. Cultivated black currants are an exception to this rule because of their extreme susceptibility to the rust and their heavy spore production. They should not be permitted to grow within a mile of white pines. It is advisable to destroy black and flowering currants throughout pine-growing regions. Other cultivated currants and gooseberries should be as widely separated from the pines as possible, because bushes usually are numerous, of large size, and grow on open sites exposed to the wind. They should not be planted in sections where white pine is an important tree. The practice of designating pine growing and currant growing districts, followed in some States, should be more widely adopted. Conditions in different localities vary, therefore it is desirable that someone qualified to judge conditions be called upon to determine the necessary width of the protective zone before control work is begun.

The amount and extent of pine infection largely depends upon the kind of currant and gooseberry bushes, their number, size, and exposure to the wind. Thus, three cultivated black currants, in a single year, infected 68 per cent of the pines in an adjacent 8-year-old plantation, but the damage was restricted to trees within 125 feet of the bushes. At another point, five cultivated black currants in a period of 15 years, have killed or commercially destroyed 47 per cent of the pines within 300 feet; but at a distance of 800 feet, less than 10 per cent of the trees are diseased. A single wild gooseberry bush 3½ feet high, and fairly well screened by surrounding forest growth, infected every white pine (25 trees) within 20 feet radius. No evidence of infection from this bush could be found at a distance greater than 50 feet. In contrast to this, an isolated wild gooseberry bush seven feet high, growing in the center of a young pine plantation and fully exposed to the wind, caused infection up to a distance of 500 feet. Infections occurred over a period of four years in both cases. The last illustration shows the importance of destroying large bushes in exposed situations.

Experiments in progress since 1916 prove that the destruction of currant and gooseberry bushes effectively protects white pine from blister rust.

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GOOD THINGS FOR NEXT ISSUE.

Dr. E. M. Kindle, who wrote "Mackenzie River Driftwood" in this issue, contributes a striking article on "A Tree Three Million Years Old." Dr. Kindle's reputation as a palaeontologist is international and his studies of fossil trees are uncommonly interesting and informing.

Mr. B. M. Morton, author of "Native Trees of Canada," the best work of its kind yet published, writes in the coming number on "The Repair of Damaged Trees."

"The Tragedy of the Buffalo," attractively illustrated from photographs and sketches is the type of fact-story with which every Canadian delights to get acquainted. If you have a boy relative in your family, hand over the next issue to his hungry hands.

PRESERVATION OF CANADIAN PULP AND PAPER INDUSTRY

By Frank J. D. Barnjum, Annapolis Royal, Nova Scotia

Some idea of the enormous consumption of wood and timber in the United States can be gained from the fact that if their entire supply were drawn from Canada alone, the total available Canadian supply would last the United States only about six years.

I have recently read remarks by an American paper manufacturer, who is, quite naturally, selfishly interested, regarding the proposed Canadian embargo against the export from Canada of pulpwood for the United States Mills. I note that the advocacy of such an embargo by Canada is described as "propaganda of men striving to serve personal ends," and from "selfish interests." But it seems to me that the selfishness is entirely on the other side, when the American mills want to deprive the Canadian pulp and paper manufacturer of his raw material.

If wood were being shipped from the United States to supply the Canadian Mills how long do you think it would be before some action would be taken along these same lines?

Canada is in a much worse plight so far as her available supply of standing timber is concerned than is the United States. So far as my own personal ends or selfish interests are concerned, my mills in Canada have the largest supply of standing wood, based on their capacity, of any pulp mills in the world, all of which land is owned in fee, with the wood now exportable to the United States. Consequently, I cannot be accused of selfish interests in supporting an embargo or export tax on pulpwood.

I am perfectly willing to acknowledge that the situation with regard to a supply of raw material for the mills on both sides of the line is critical, and, as a matter of fact, sulphite pulp, at least, should even now be manufactured out of some annual crop instead of trees, even though the quality would be inferior, and the cost much greater. We need what standing wood supply now remains for the building of homes and uses for which there is no substitute for wood.

I note it is stated that Alaska can furnish perpetually one-third of the print paper consumption in the nited States, but when we consider that paper uses only about three per cent. of the total amount of wood cnosumed annually in the United States, one-third of this would be merely one per cent. of our total consumption, so we might as well forget Alaska. Furthermore, as a matter of fact, when Alaskan wood is used to any extent it will not be reserved for paper alone but will be used for all other purposes for which wood is required. And, when you consider that the entire supply in the Alaska National Forests would last

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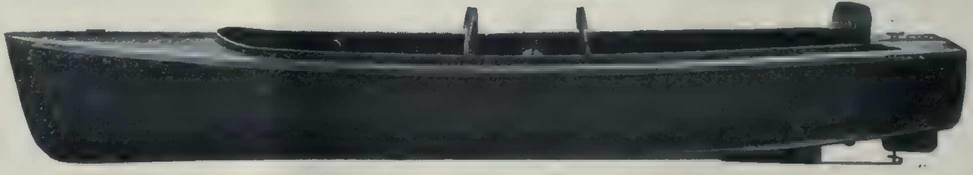

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MILLS AT IROQUOIS FALLS, ONT.

the United States for all purposes only a matter of about one year, it will be readily seen that we are only raising a false hope in counting upon Alaska for a future paper supply.

Some idea of the enormous consumption of wood and timber in the United States can be gained from the fact that if their entire supply were drawn from Canada alone, the total available Canadian supply would last the United States only about six years.

The present temporary surplus of pulpwood and lumber was simply brought about by the high prices of 1920, which enabled the lumbermen to operate in the remote sections that contain our present remaining supply. As soon as business returns to normal, this apparent surplus will very soon vanish and will not be replaced until prices become sufficiently high so that the lumberman can again pay for the long hauls. In proof of this assertion, lumber is being sold at the present time at an actual loss of $15 to $20 per thousand feet, and pulpwood in about the same proportion.

This shortage of standing timber is world-wide, so we cannot look to other countries for supplies. As soon as business resumes anything like normal proportions there will be a sad awakening for our pulp and paper mills in so far as their supply of raw material is concerned; and that is why I say these mills should begin even now to use some annual crop as a substitute, at least for their sulphite pulp.

When such authorities as Senator W. C. Edwards of Ottawa, one of the best posted lumbermen of Canada, state that the standing supply in Eastern Canada will be exhausted in about twelve years, and R. W. Hibberson of the well-known timber cruising firm of Hibberson Brothers of Victoria, British Columbia, advises us that even British Columbia will be facing a timber famine within fifteen years, surely the time has arrived for some immediate action towards the retaining of our remaining supply for our home industries.

TREES

In the Garden of Eden, planted by God,
There were goodly trees in the springtime
sod—

Trees of beauty and height and grace
To stand in splendor before His face.

Apple and hickory, ash and pear,
Oak and beech and the tulip rare.

The trembling aspen, the noble pine,
The sweeping elm by the river line;

Trees for the birds to build in and sing,
And the lilac tree for a joy in spring.

Trees to turn at the frosty call
And carpet the ground for their Lord's
footfall;

Wood for the bow, the spear and the flail,
The keel and the mast and the daring sail;

He made them of every grain and girth
For use of man in the Garden of Earth.

Then, lest the soul should not lift her
eyes
From the gift to the Giver of Paradise,

On the crown of a hill, for all to see,
God planted a scarlet maple tree.

Bliss Carman.

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Our Car in New Brunswick.

Regarding the New Brunswick tour of the Canadian Forestry Association Exhibit Car, Mr. W. B. Snowball, of Chatham, N.B., a well-known lumberman writes: "I am satisfied that the car is a great educator and will do a great deal towards eliminating the unnecessary destruction of our foresst."

Mr. G. H. Prince, Provincial Forester of New Brunswick, writes: "I do not hesitate to say it is a splendid success and has met with great audiences in all parts of the Province. Our meetings here in Fredericton this morning were splendid; 1,900 children and school teachers attended the three meetings, beside a considerable number of citizens. Expressions of approval were heard on all sides. I have to thank you for what you have done to allow the Exhibition Car such a long run in New Brunswick this year."

At Fredericton, N.B., the Provincial authorities arranged for three meetings on Monday morning, May 23rd. The first, 9.30 a.m., was addressed by Col. Loggie, Deputy Minister of Lands and Mines; the second, 10.30 a.m., by Dr. B. C. Foster, Principal of the High School; the third, 11.30 a.m. (for Normal School Students and the Public) by Bishop Richardson.

The Canadian Forestry Association has enjoyed the heartiest cooperation from the New Brunswick Forest Service, the Minister of Lands and Forests, Hon. C. W. Robinson, having acted as chief speaker at two of the large public meetings. Through Mr. G. H. Prince, Provincial Forester, and his staff, the arrangements of the tour were everywhere facilitated, advance advertising was furnished, and excellent audiences assured. The value of educational propaganda is nowhere more intelligently appreciated than by the New Brunswick Forest Service.

The Printers' Strike.

Owing to the tie-up of Ottawa printing offices, through a strike of printers, it was found impossible to issue in June or July the Canadian Forestry Magazine. Many other Canadian publications suffered a similar dislocation. It is probable that such interferences will not be encountered again this year. For the omission of these issues, under such unavoidable circumstances, the Editor asks the indulgence of readers and advertisers. The present issue is many pages under normal size.

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MONTREAL.

The Doom of the Modern City

To the students of the New York State College of Forestry at Syracuse, N. Y., Laurie D. Cox, professor of Landscape Engineering declared that the American city, the modern city of today, was only an experiment and that the question as to whether it would endure in its present form as a place of human domicile was problematical. Prof. Cox intimated it was quite possible that a new system of city planning would have to be adopted within the next fifty years.

He said that it had not been settled by any means that we could go on living in the city under the present system, because the tendencies of the urban community were discouraging to human efficiency, due principally to nervous tension and the poverty of out-of-door recreation places. This is not so much a physical need, as is commonly believed, science having largely overcome many of the physical disadvantages of city life. It is a mental need. Only about three generations can survive the shock and confinement of the modern city without mental impairment.

One of the first considerations of the landscape engineer is to counteract the destructive effects of large numbers of persons crowding their business places and their inhabitants together, living in narrow, noisy quarters and being deprived of the fresh air, quietude and perspective of the country. The city of the future may be designed to obtain primarily mental recreation rather than physical recreation.

Prof. Cox also told the students that while striving to overcome the effects of the concentration of population in the city it was also incumbent on the landscape engineer to leave the mark of adornment and beauty on his work.

---

1. Trees are beautiful in form and color, inspiring a constant appreciation of nature.
2. Trees enhance the beauty of architecture.
3. Trees create sentiment, love of country, city and home.
4. Trees have an educational influence upon citizens of all ages, but more especially children.
5. Trees encourage outdoor life.
6. Trees purify the air.
7. Trees cool the air in summer and radiate warmth in winter.
8. Trees improve climate, conserve soil and moisture.
9. Trees furnish resting places and shelter for birds.
10. Trees increase the value of real estate.
11. Trees protect the pavement from the heat of the sun.
12. Trees counteract adverse conditions of city life.

The Plea of the Pines

By James Lawler, Dominion Forestry Branch

We are the tall white pines. We are Canadians and love our country. Some call us lordly, but we do not want to lord it over any one. Men! We are your brothers and desire to serve you, and serve with you, to make our land the best in the whole world. Some praise us and call us stately and magnificent, and then treat us as enemies; we desire less praise and more friendship.

We are not unmoved by the joys and sorrows of our human brothers. We do not resent it when we are cut down and made into useful things. When a tree is made into a hobby horse, it rejoices with the child who bestrides it. When we become a cradle, we protect the infant we hold with somewhat of the joy and solicitude of a mother. When we are rafters and sidings of shingles, we keep away cold and storm from the little family with the care of a father. When made into a canoe, we rejoice in the joy of the lovers we bear slowly and safely through quiet pools and shady narrows. We rejoice with them that do rejoice and weep with them that weep. Yea, human brothers! We do more. We go down into the grave with you; and you and we together return to the dust from which we both sprang.

You call us lordly, write sonnets about our evergreen topmost branches which comb the fleeces of the clouds, you extol our soft, straight-grained, cream-colored wood, and yet you treat us as if we were possessed by devils. You have driven us off the fat, fertile lands and put them under the plow. We do not complain of that: it was inevitable, but we do complain that after we have gracefully yielded up the rich lands you have pursued us into the hills and barren lands, and harried us with fire and axe, as if our family were vermin to be exterminated. We do not complain that you cut us down when we are grown. That, also, is inevitable. But we do complain that when you have cut down the tall trees you smash down the seedings, the babies of our race; that you kill the birds which protect us from the insects; and that, above all, you let flames devour young and old, mother-tree and sapling, yea even the very earth in which we stand, so that we can establish a family again, no more for ever.

Give us the Waste Lands

We will, human brothers! make you, on behalf of our family—of our brothers, the spruces and firs, and our cousins the hardwoods — a solemn offer, a fair bar-

nor the rich lands around the lakes, nor the prairies; let the farmer take them — he feeds you. We do not ask the good pastures; let them go to the shepherd — he clothes you. But give us only the waste lands, the sandy barrens, the boulder-strewn table-lands, the rocky hillsides and we will bless you. We will shelter

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O, men of Canada! O, men and women, boys and girls of Canada! is it a bargain?

Oregon and Fires

By F. A. Elliott, State Forester.

Over $640,000,000 in merchantable timber is annually endangered by fire in Oregon. Timber, next to land itself, is the state's greatest resource. The lumber industry today employs ten times as many men as any other manufacturing industry. The importance that forest protection plays in the prosperity of the state is therefore readily understood.

From May until October each year the fire danger is ever-present. Thirteen per cent. of the fires are caused by lightning while 87% are caused by human ingorance, carelessness or malice.

The State Forester is principally concerned in the suppression of such fires as do occur and in the elimination of those 87% man-caused fires on the 9,000,000 acres of privately owned timberland. Probably in no other state will be found better co-operation in forest protection than exists in Oregon between the Federal and state forest services and the timbermen themselves. Their combined efforts through organized systematic patrol, and fire fighting work backed by effectual laws, have eliminated over 90% of the annual forest fire losses.

Oregon's forest fire law is second to none. Its most unique provision is the compulsory forest patrol section, founded on the principle that all timber owners should bear their proportionate share of the protective cost. Assessments made on an acreage basis thus provide for patrol, improvement and fire suppression work in the timbered districts. This law has met with the universal approval of the timber owners and has materially aided in solving the state's fire problem.

The War Department has cooperated in forest protection during the past two seasons. The 1920 aerial forest patrol consisted of eleven planes and operating per-

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sonnel. A distance of 90,800 miles were flown, and 719 fires reported, with 89% efficiency in their location.

The keeping of our forests green until they can be properly utilized must be attendant not upon forest officers alone, but upon the co-operation of all users of the forests either for pleasure or profit.

The present pressing need is added Federal aid and greater state participation in the cost of fire elimination, in order that the existing organization may be amplified and made more efficient.

FORESTRY IN SWEDEN.

By Edward Beck.

STOCKHOLM, Sweden, June 5. —Co-operation between the State and the owners of the private forests accounts in a large measure for Sweden's pre-eminence in forest development. The State's liberality in providing the means, its wisdom in enacting reasonable laws for the preservation of the forests and to provide for their continuity, combined with the private owners' willing compliance therewith, constitute the second most important factor.

There is apparently no conflict between the State and the private owners in these matters. Swedish forests have been under legal control for more than seven centuries. There are a few general laws applicable to the entire country. Different laws apply to different provinces or districts. Their enforcement and supervision are invested in local forest commissions, one for each province, which in turn, is answerable to the State Forest Service, which has general supervision both of the forest laws and of the State-owned forests. The commissions usually comprise in their membership a representative of the State, one of the private owners, and one of the immediate district concerned. Besides enforcing the law and arbitrating disputes, they maintain forest nurseries and distribute plants and seeds for purposes of reforestation. They encourage the planting of idle lands and promote local interest in tree culture. Their expenses are met by means of a small tax imposed on the stumpage values of the timber cut in their respective districts. They are also subsidized by the national and the provincial Governments and derive additional revenue from the sale of seeds and plants. They serve to obviate some of the objections which the owners of the private forests might otherwise offer to interference with their rights of private property in their forests.

In 1918 it was found necessary to pass a stringent general law forbidding the cutting of young growing forests unless and until it was shown that such cutting was essential to their improvement. Exception was made in the case of land destined for agricultural purposes, pastures, building sites, etc. In enforcing this law the commissions are empowered to fine disobedient owners, to confiscate wood illegally cut and to prohibit absolutely for stipulated periods any further cutting on the areas involved. In such cases the owners have the right of appeal to the courts. This law is the result of excessive cutting during the recent war period when the demand for lumber and its price were both abnormal.

Laws fixing a minimum diameter limit for cutting, such as prevail in Canada, have been applied from time to time in several of the pro-

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vinces. They have usually proven unsatisfactory and are not regarded as having contributed to the general improvement of the forests.

Speaking generally, it may be said that the state's efforts are directed principally to securing a greater volume of reproduction. The private owners, while not neglecting this important feature, are said to excel in improved logging operations and in forest upkeep. No new laws are enacted for the control of the forests until there has been full and free deliberation between the governmental authorities and the private owners. New laws and regulations are usually the result of mutual agreement.

The Swedish public forests are managed by the Swedish Forest Service, operated as part of the national Department of Agriculture. The Service is governed by a director general and six assistant directors, with district foresters, assistant foresters, forest engineers, etc., for each of the several districts into which the public forests are divided. The Service is organized on semi-military lines. It has a distinctive uniform and a very pronounced esprit-de-corps. Its personnel includes young men of high social standing to whom the remuneration paid, which is less than unskilled laborers receive in Canada, is probably a secondary consideration.

The Forest Service has complete control over the state forests and either supervises or manages the other publicly owned forests, such as those owned by various counties, villages, parishes and communities, many of which, by the way, derive considerable income from the proceeds of their forest possessions. It has charge of the execution of the laws governing the management of all forests and of cutting and all other regulations. Its officers pay visits of inspection to private as well as public forests to see that the laws are being observed.

An official estimate made in 1908, placed the value of the state forests at that time at $62,000,000; of other public forests at $21,000,000 and of private forests at $334,000,000, or a total of $417,000,000. These values are said to have advanced from 25 to 35 per cent. in the meanwhile.

Taxes on private forests have risen considerably during and since the war and now amount to as much as 40 to 45 per cent. on the income derived from them. There is, however, no important tax imposed on standing timber, as it has been thought that such a tax besides being an inducement to unnecessary cutting might deter private capital from being employed in reforestation.

The State Forest Service derives its revenues from the sale of standing timber and in other ways. It shows an annual surplus. It expends about 50 per cent. of its income on forest improvements and upkeep. This is in marked contrast to what the Canadian provinces are doing for their Crown lands. Quebec, for example, which is more liberal in its forest appropriations than most, has 45 millions of acres under license against Sweden's less than half that extent. Quebec derives an annual income of about $4,500,000 from its Crown lands and appropriates for their upkeep, administration and improvement about $400,000. Sweden on the other hand, out of an annual revenue of about $5,000,000 puts approximately $2,500,000 back into her forests.

Education plays an important part in Swedish forestry. The government spares no expense in educating and training picked men for forest work in both its higher and its less important branches. A college of forestry has been in existence here since 1828. It is now located on beautiful grounds on the outskirts of Stockholm in buildings especially erected and well adapted to its purpose. It gives instruction in both theoretic and practical forestry, its course covering three years. The entrance requirements include nine months of practical training in the field as well as a certificate of graduation from a high school or college. It is said to be without an equal in Europe. Its courses are in such demand that would-be entrants have to go through a preliminary elimination trial, which only two-thirds of those entering survive. Its graduates are in great demand for both government and private service.

In connection with the college the government maintains a forest laboratory which devotes all of its efforts to research on questions bearing on forestry. It has two sections, one devoted to forest management and to investigation in regard to the growth of stands, and the other mainly to geological and botanical subjects. It is exceptionally well-equipped and ably staffed. A visit disclosed a number of important and interesting experiments in progress. The laboratory maintains experimental areas in all parts of the country and is doing a work that no private agency is competent to undertake.

The State also maintains a number of schools of a lesser grade, sit-

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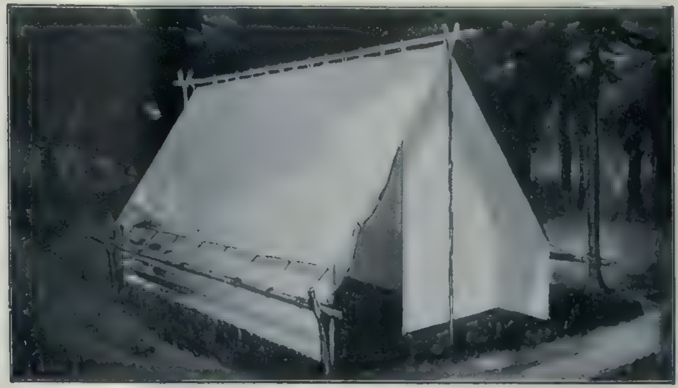

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uated throughout the country, chiefly for the training of forest rangers. There are eleven of such schools in all. At each school there is an experimental forest area for the practical instruction of the students, who are also required to spend part of their school year in the forests, themselves doing actual forest work. The course usually comprises a full year of study and the object sought is practical insight into forest management and the supervision of forest operations. Charcoal burning, which is an important part of the industry is also taught.

A visit of inspection was made to one of the best of these rangers' schools located near Bispgarden in middle Sweden, where it has been established since 1898. The school has a director and assistant director who live on the premises. It employs two rangers and other necessary staff. It graduates eighteen students every year. A primary education is sufficient for admission. The average age of the students is twenty-two years. There are many more applicants than can be accommodated. The students are lodged and boarded at the school free of charge, their only expenses being for books, etc. Each student is allowed 25 kronor a month ($6.25). The studies are mostly of a practical character and include forest accounting, ditching, loggers' camp construction and other co-related subjects. The school maintains a nursery as well as an experimental plot. It also operates an extensive plant for the extraction of seeds from tree cones. It buys the cones in large quantities from the private forests and other sources and markets the seeds all over the world, deriving a large revenue therefrom.

The work that this school and its fellows are doing in training men for practical work in the forests cannot be overestimated. In the opinion of the visitors it supplies one of the most important elements in Sweden's progressive forest policy.

Reforestation as practised in Sweden and forest fire protection will be treated in future articles.

Industries Peter Out

The New York State College of Forestry at Syracuse, announces that its wood using survey of New York State, made in co-operation with the United States Forest Service, shows a 30 per cent decrease of the number of wood using concerns in the state since 1912, as a result of the disappearance of the forests which furnished their raw material. This survey is indicative of what would be disclosed by survey of other states.

Sir George Foster's Opinion

Department of Trade
and Commerce
Ottawa, May 10th, 1921.

Robson Black, Esq.,
Secretary.
Canadian Forestry Association,
Ottawa.

I have yours of the 9th with enclosed copy of letter from your Western Organzier and Illustrated educational sheet.

I am very much pleased indeed to receive the information you were kind enough to send me and to know that there is so general and enthusiastic a response to the campaign that you have put into operation, which, if carried on with the impetus of its commencement, as I have no doubt it will be, will really almost revolutionise the North-West in this respect. Great credit is due to your Association for its patriotic and enterprising work.

Yours very truly,
(Sgd) Geo. E. FOSTER.

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Good Fire Publicity

The Dominion Parks Branch, Department of the Interior, is responsible for another ingenious means of appealing to the public to prevent fires in the National Parks. A "Luck Piece" has been designed, which is stamped out of aluminum and bears the terse, yet significant warning on one side, — "Prevent Fires — Save the Forest" together with the words, —"Buffalo Medicine" (Luck Charm). The connection between the idea of a luck charm and the preservation of the forests, which everywhere clothe the valleys and the slopes of our National Parks, is best explained in the little pamphlet which accompanies the luck piece, tucked away in a neat little miniature "medicine bag" of an attractive Indian design. These little tokens will be handed out to hundreds of visitors to the National Parks this season and there is little doubt but that they will effectively carry the message they are intended to convey.

Riga, Russia.—Forest fires are sweeping the great timber belts of Central Russia with such frequency and in such magnitude that a catastrophe for the forest area is threatened, says the Moscow Isvetia, which places the responsibility for these conditions upon the drouth, the carelessness of the peasants and the disorganization of the forest service.

These statistics are incomplete, but in 24 provinces 11,364 fires have been reported, destroying or damaging 5,400,000 acres of timber, the newspaper states.

According to information reaching Moscow, adds the Isvetia, in 22 provinces 29 per cent. of the fully grown trees, forty per cent. of the middle growth and 31 per cent. of the young growth already has been damaged.

THE WORSHIP OF TREES

Concluded from page 335

many generations and the actual belief in them in many cases are startling evidences of the natural conservatism of the human mind.

Why a Chestnut is "Lucky."

Primitive people personify the soul, or rather the spirit or ghost as they call it. The indwelling spirit is usually the miniature of the human form or it may be a bird or if a wicked spirit, it may take some grotesque animal form. When the spirit leaves the body it may take up its abode in a tree or other kind of plant, in an animal, in a stone, mountain or body of water. All nature is filled with spirit forms. All diseases and misfortunes are caused by the dominance of some evil spirit in the body. Having

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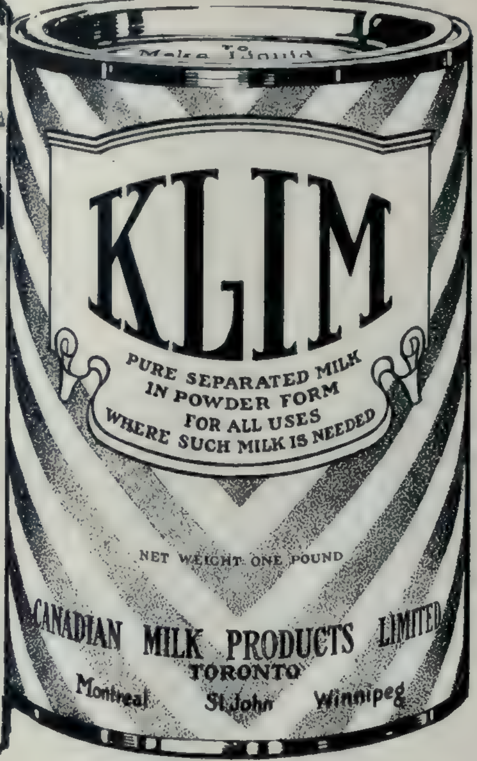
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such beliefs, it is only natural that rites and ceremonies should have been evolved to prevent an evil spirit from entering the body or to expel it when it has once entered, or in other words, the use of magic. The next step is the belief in the efficacy of charms and we find many of these associated with trees. Most of us as children have carried horse-chestnuts, acorns, walnuts or hickory nuts in our pockets for good luck or to ward off some ailment. Those of us who went often to the swimming hole carried some charm to keep away the cramps. We can remember when our grandmothers stirred the home-made soft soap with an ash stick or hazel stick, or put an ash stick or some other charm into the churn to hasten the coming of the butter.

Strange Cures for Disease.

The ash tree, and by confusion of names, the mountain ash, plays an important part for some reason in tree magic. In my native State within a few years, a man cured himself of fever and ague by tying himself (and it) to an ash tree and then crawling out of his bounds, leaving the disease tied to the tree. In England children are sometimes passed through a cleft ash tree to cure rupture. A young ash sapling is split longitudinally for a few feet and the child is passed three times from east to west through the fissure at sunrise. There are many variations in the ceremony in different localities, but in all of them as soon as

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the ceremony is performed, the tree is bound up and the fissure plastered with mud or clay. The belief is that if the tree heals, the child's body will heal, but if the cleft does not heal, the operation will not be successful. If the disease is cured and some one cuts down the tree, even a long time afterward, the disease will reappear. Thus not long ago a man who had recently taken possession of an estate in England and in making improvements planned to cut down some ash trees, was asked by a neighbor not to cut a certain tree for he as a child had been passed through it.

A similar cure for various diseases, but especially for rupture, has been commonly practised in nearly every country of Europe, but on the Continent the tree employed is usually an oak instead of an ash. Ten or a dozen years ago the ceremony was performed in Newfoundland, only the tree used was a mountain ash instead of the real ash.

In Aid of the Milk Supply.

One finds in folk-lore literature many references to the mountain ash or rowan tree as an effective agency against evil spirits. In Westphalia, for example, the herdsman cuts at dawn on May Day just as the first rays of the sun are touching it, a rowan tree and switches his cows on the flanks with its branches to drive away witches which are particularly likely to rob the cows of their milk on the morning of May Day. In Scotland the branches of the rowan tree are placed over the doors of cow stables for the same purpose. A still better way of attaining the same object is to tie a cross of rowan tree wood with a scarlet thread to the tail of each cow. A modified relict of this belief is found in New England, where it is said that cattle will drive better, if the farmer carries a white ash or a mountain ash stick.

Fortune Follows the Rowan Tree.

The practice of driving away evil spirits by beating with switches is common in the remote districts all over Europe and South America. Among people who no longer believe in evil spirits the custom still persists on certain festival days, such as Easter, Christmas and New Year's, only now the ceremony is said to bring good luck. It is a general belief in the rural districts of New England and also in Eastern Canada, that a mountain ash tree on the lawn or in the garden brings good luck to the household. That may be the reason so many of them are to be found in our cities. The same idea is found in the custom of planting a tree at marriage or at the birth of a child.

Thus I have tried to outline the role which trees have played in the imagination of primitive people to show you that trees were regarded as the abode of spirits and as such, worshipped; they being the largest and dominant forms of vegetable life, their spirits influenced the fertility and productiveness of

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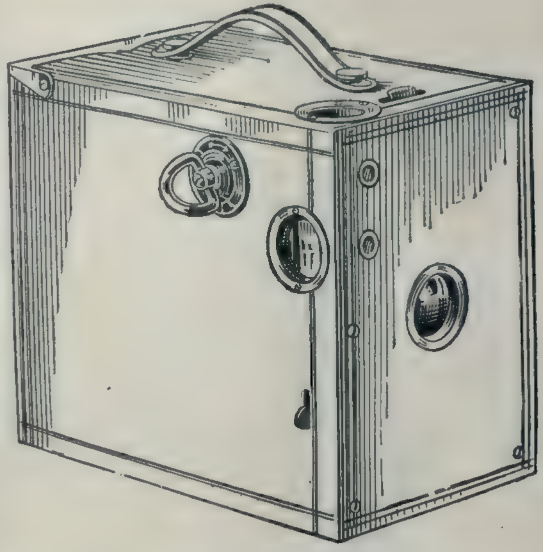

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the weaker and more lowly cultivated plants; that this influence was transferred to domestic animals and the lives of men, and finally how some of these beliefs, long outgrown, have been handed down to us as mere superstitions. The prosaic and coldly rational temper with which modern men regard the manifestations of nature was unknown in the childhood of the race. Our primitive ancestors knew nothing about the laws of nature, nothing about physical forces, nothing about the relations of cause and effect, nothing about the necessary regularity of things. The only force they knew was the force of will; they believed all nature to be directed by the will of spirits whom they gave human, animal or vegetable forms and so built up their wonderful fabric of un-imagination.

Personally, I regret the passing of the imaginative and the poetic attitude of mind in regard to the trees and to the courses of vegetation as a whole. I think thereby we lose a great deal from our lives. There are times at least when it is good for the soul to forget that nature is ruled by cold, unalterable laws. For example, when we see the coralline buds of the arbutus pushing their way through a lingering snow bank or the delicate petals of the violet unfolding in their bed of fallen leaves; when we study the graceful branching system of the white birch or of the spired crown of a fig tree outlined in the winter's twilight; when we behold the passing glory of the autumn or in the spring feel the cosmic surge of re-awakening life feelings come to us which never could be inspired by the dogmatic rules of the laboratory or by the exact methods of scientific research. At such times we sympathize with those primitive people who tinged the manifestations of nature with the warm hues of the imagination and clothed them in the graceful drapery of mystic fancy.

Wind Damage on Prairies

Winnipeg, Man., May.—Saskatchewan has suffered considerably as a result of severe windstorms which swept over various portions of that province recently and, as a result, a great deal of seed was blown out of the ground, but the sections most affected are those which did not have the entire crop destroyed, said J. B. Musselman, secretary of the Saskatchewan Grain Growers in an interview here.

"We had eight days of wind", said Mr. Musselman, "which did a vast amount of damage in central Saskatchewan, reaching from the Manitoba boundary to north of Saskatoon. In the aggregate, a large acreage will have to be resown, but the greatest damage will arise from drifting of the soil itself and evaporation of an immense amount of moisture."

INCREASE RAILWAY PATROL.

Ten handspeeders were purchased recently by the New Brunswick Forest Service and put to work patrolling the railroad from Nicol to Moffat's, on the St. Leonard's subdivision, seven miles of railroad being assigned to each patrolman, who will follow every train, and extinguish any fires that may occur. These ten hand speeders replace two power speeders which have proved unsatisfactory.

The order forbidding the burning of brush after the 10th of May has been well observed by the settlers especially in the northern part of the province. This order has received the approval of the licensees of the Crown Lands, Insurance Companies, and of many others interested in the prevention of fires, and it has been fully justified by the results obtained.

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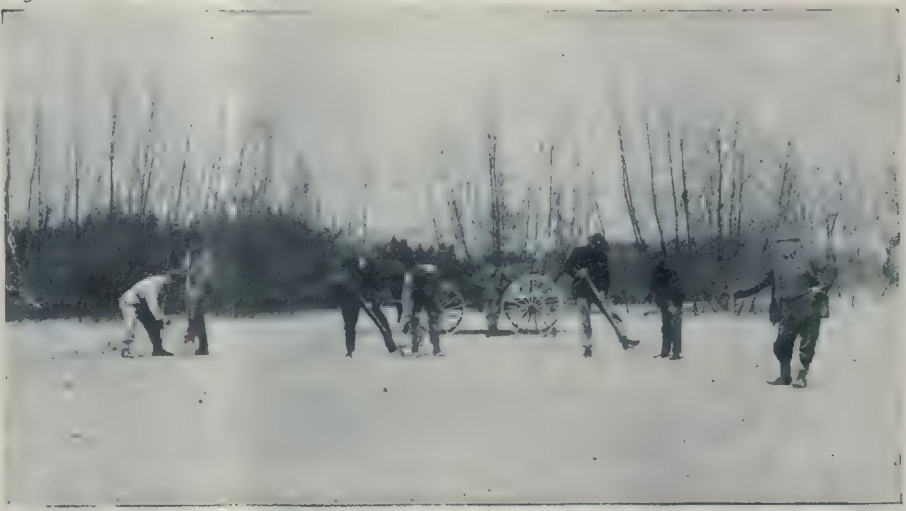
VOL. XVII. OTTAWA, CANADA, SEPTEMBER, 1921. No. 7

Planting The Sand Banks of Prince Edward County

By Arthur Herbert Richardson, Ontario Forestry Branch.

During the spring of this year the Forestry Branch of the Ontario Government has been carrying on planting operations in connection with the reclaiming of certain needy areas in Prince Edward County. The area where this work has been done is a section of land situated about 9 miles south-west of the town of Picton. It consists of a narrow triangular piece of sand formation, which separates West Lake from Lake Ontario and extends for 5 miles south and east from the town of Wellington.

In the memory of residents in the neighborhood, all the sand at one time was quite near the shore of Lake Ontario. It consisted of high hills and deep swampy tree growth, and the latter with thick cedar swamps and areas suitable for pasture. But as time went on, the oft repeated foolishness of clean cutting wooded areas on poor soil was indulged in, the trees were removed, with the result that the fine particles of sand of which the hills were composed, commenced to drift and despoil forest land and good agricultural soil as it was driven by the prevailing north-west winds.

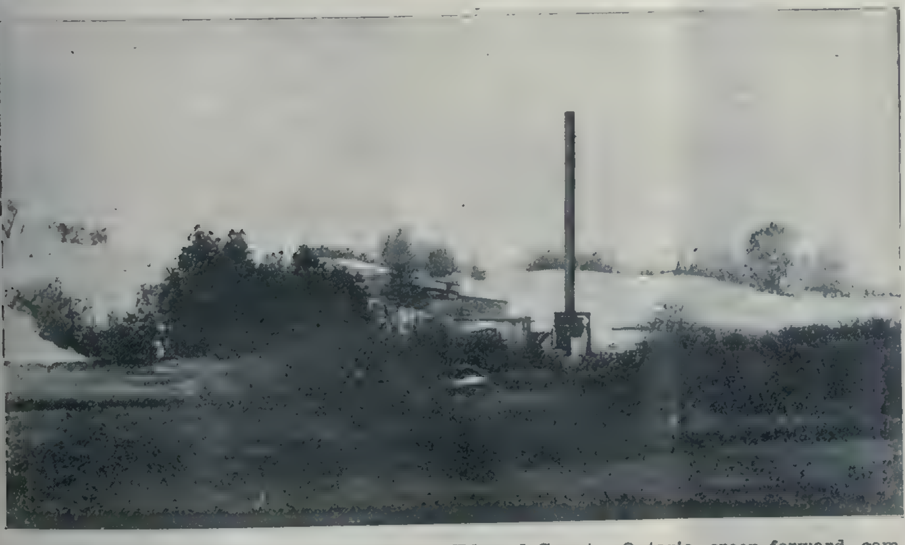


Blocking the sand dunes of Prince Edward County, Ontario, by planting trees. The planting gang is putting in willows and poplars. The willows in the background have attained their remarkable height in ten years.

Oat Crops Ruined.

The large areas occupied by grassy hollows have long since been buried, the good agricultural soil, which is capable of producing 75 bushels of oats to the acre, has been inundated to the depth of thirty feet. Excellent cedar stands have been covered and killed, and then uncovered again as the sand moved slowly but steadily on its way. The original roads of the community now lie under 30 feet of waste, and one section of the thoroughfare has been laid out four times. To-day when you follow the road, as it makes a wide detour from its rightful position, the sand monster is seen, suggestive of some insidious serpent as it sneaks its way through the forest and over fields in crop.

For a number of years sporadic attempts to hold the sand were made, clumps of Willow were set out and brush fences were tried but with little result. In 1911, however, the farmers who were being "buried alive" secured a small grant from the Township Council for the purpose of planting trees. Several rows of "Holland" Willow were ploughed in along a part of the roadway with excellent results. To-day these trees have effectively accomplished their purpose. They aver-



Foot by foot the sand dunes of Prince Edward County, Ontario, creep forward, completely submerging all land and buildings in their path. The picture shows an abandoned mill which is already partly buried.

The silent advance of a great power of destruction. Sand dunes creeping across farm land. Four roadways lie beneath the billows.

age 20 feet in height and are a testimony to what may be expected from planting such species. Much credit is due those who initiated this work and for selecting the species which they did, because none other could have done the work better.

The movement of the sand is so rapid that only a few fast growing and tenacious trees can be used for such purposes, among the best being certain species of Willow and Poplar. And, moreover, such planting material is easily obtained, is quickly planted, takes root readily in the sand, and, best of all, stands an unlimited amount of punishment.

Planting in Belts.

The trees planted this year by the Forestry Branch consisted of 150,000 mixed cuttings of "Holland" Willow (the same species used by the local farmers ten years ago), and our native Carolina Poplar. The trees were planted in belts 100 feet apart, each belt containing from 6 to 8 rows of trees of both species and ran at right angles to the direction of greatest drift.

The areas under process of reclaiming is in the neighborhood of 150 acres and includes the part where the damage is most imminent. In succeeding years the work will extend along the entire 5 miles towards the town of Wellington, and the time is not far distant when, where there was once desolate waste carrying destruction in its path, there will be, through wise and practical forestry methods, an area of valuable and beautiful woodland.

Beautifying the Barren Areas

By Henry J. Moore, Forester, Ontario, Dept. of Highways.

It is not too much to expect that men and women who are fortunate enough to travel along the Ontario Provincial Highways, even of the present generation, will be privileged to enjoy some of the results of the policy of beautification of the Department of Public Highways. Already many miles of roadway have taken on a more cheerful appearance and this augurs well for the future. But it is not to the trees which line the roads alone that the writer would draw attention in this article, but largely to the work of landscaping and reforesting the barren and unsightly areas which from time to time have or will come into possession of the Department.

Engineers, in order to create more easy grades have had to make considerable cuts, and fills, and were oftimes steep and barren slopes of these to be left unbeautified many cheerless and uninviting scenes would obtrude themselves upon the vision. These areas, however, are not to be left in this condition. They are to be planted with trees and restored to a condition of natural beauty.

Reforestation Plots.

The Department of Public Highways owns many quarries and gravel pits, and when these are finally abandoned the areas are to be reforested with trees of commercial value, fortunately many of these areas are adjacent to or contiguous with the Privincial Highways, and from these the tourist will be able to see the results of the work without even alighting from his motor. It is hoped that apart from the commercial value of the timber, a valuable educational factor will be established, for as men see the improved condition of these areas and the profitable use to which they are put, they are very likely to follow the example.

At one point namely the steep banks of the rouge cut about fifteen miles east of Toronto on the Toronto-Montreal Highway, reforestation has already been started. Three thousand seedling pines were planted during the past spring, and it is expected that the planting of this particular area will be completed next year. The seedlings were kindly supplied by Mr. E. J. Zavitz, the Chief Forester of Ontario, from whose Department, as time goes on, the Department of Public Highways expects to get much planting material.

Departmental Nurseries.

The demand for small stock for planting on the Department's lands having become so great it is within the bounds of possibility that nurseries will be established to produce the many necessary kinds of trees. It is essential that these nurseries be located at central points from which will be facilitated the quick removal of the subjects to their permanent positions during the planting seasons.

So far the cost of planting along the highways has been small and an increase in the cost is not expected, in fact it is so small that the value of the timber in the next generation on the areas to be reforested will more than pay for entire planting operations along the 2,000 miles of Provincial Highway. This does not mean that the trees which are lined along the roads, or grouped in the various parks will be cut, but those on the areas which are planted under a proper scheme of reforestation.

Even should the commercial trees fail to pay for the work, what of the beauty? Is it not worth something? Twenty years hence Ontario will not care to sell the asset of beauty along its highways for millions of dollars for if as men and governments come and go, they in their wisdom continue the policy of beautification and reforestation, the highways of Ontario will express to the world the fact that long ago our legislators rose above petty politics with a desire to beautify and to dignify what will be the greatest highways of the world. Will they not be? For do not all roads lead to Canada?

Men and women of vision look into the future,—fifty years hence: can you see the heritage of your children, and of those who in the order of things will come from other lands? At all times these trees will be beautiful. In spring with bursting bud, in summer with garb of livid green. In autumn with russet and gold, and in winter when garbed in a mantle of shimmering white and clearly silhoutted against a frosty sky the very beauty of their nakedness will baffle human expression. Silent as the snow which caresses them words will fail to describe their imperious beauty as queenlike they rise out of the haze to be crowned by the morning sun.

Shade Tree Injuries and How to Repair Them

Many large Trees not worth the High Cost of "Surgery" — Principles the Amateur should Understand.

By B. R. Morton, B. Sc. F., Dominion Forestry Branch.

In a beautiful and historic Nova Scotia town, Annapolis Royal. The elm trees shown in the photograph were planted by the late Mr. Justice Ritchie 150 years ago. The picture was taken early last Spring when the foliage had not yet attained full growth. A resident of Annapolis Royal writes to the Canadian Forestry Magazine: "This town will always hold Mr. Justice Ritchie in grateful remembrance for giving us these trees." Could any man desire a more enduring epitaph?

The history of tree repairing probably dates back as far as the cultivating of trees. It is only within recent years, however, that the present methods used in the work have been developed and a widespread interest created.

There is nothing mysterious about tree repairing. It can be undertaken by any careful man who is not afraid of hard work and who will take the pains to familiarize himself with the fundamental principles which underlie this work. Practice is of course a great advantage since it develops quickness in determining the proper thing to do, and speed in doing it. Many amateurs who undertake this work go wrong chiefly because they do not understand the reason for doing certain things. They will often give a great deal of attention to conspicuous injuries and overlook completely the smaller ones which will later become serious.

It will not be possible within the space available, to discuss fully all sides of tree repair work, but it is hoped here to point out a number of things which will give some of the readers of the Canadian Forestry Magazine a better understanding of the work and perhaps be of assistance to tree owners who are either obliged to take up the work themselves or employ some one of doubtful skill.

Trees Worth Repairing.

The question as to whether or not a tree is worth saving must be decided by the owner, even the expert tree repairer can only advise him as to the probable cost and the chance of restoring the tree to health. Most healthy, vigorous young trees requiring minor repairs are, as a rule, worth the effort. In the case of old trees that require the expenditure of a considerable sum of money and much labor, the owner, in the opinion of the writer, is often ill advised in making an effort to restore them. Unless it has historic associations or is a rare species, it would, in many instances, be better to

A graphic history of an Ontario sand dune. The marshy flat by the lake was once a mountain of sand which in the course of years was blown inland, submerging farms and buildings. The stumps of the original trees have been uncovered by the process and some vegetation is springing up in the moist soil.

PRINCIPLES OF TREE REPAIR.

The fundamental principles which must be observed to secure the best result are briefly as follows:

1. All diseased, decayed, injured or dead material must be completely removed. This may necessitate the formation of large cavities.
2. All wounds must be sterilized and then made waterproof.
3. Deep cavities must be covered or filled, or left in such a condition that they will heal readily.
4. The tree must be kept under observation and immediate attention given to any defects that may appear in the work and to any new injuries that may be received.

Time for Repairing.

Tree repairing may be done at almost any time of the year except in the spring when the buds are swelling and the new leaves being formed. When the sap is running actively it may interfere with the work. If concrete is to be used the work must be done when there is no danger of frost.

have the tree cut down and replaced with a younger one. It requires considerable hard and tedious work to gouge out decayed areas and fill the resulting cavity with asphalt or cement. These operations are, therefore, expensive and one can readily spend one hundred dollars or more on a single tree. There might be no objection to this cost if one could be absolutely certain that the tree would thereby be restored to permanent health and vigor. Unfortunately, however, no matter how conscientiously the work may have been done, one cannot always be certain of the results until some years have passed. It is not always possible to be absolutely sure that all traces of infection has been removed from areas difficult to reach, particularly since there is seldom a definite line of demarcation between sound and diseased wood. Small cavities in healthy trees can be treated and filled with a certainty of success, but it is in the cases of large complex cavities, particularly those in the upper part of the trunk involving split and decayed crotches, that we can not be certain of securing a permanent water-tight job.

It is not the intention of the writer to discourage the reader and give him the impression that all tree repairing is useless. That is not the case. Many trees with extensive repairs have undoubtedly benefited by the treatment they have received and their life has certainly been prolonged. What it is desired to emphasize is the fact that we cannot always be certain that old trees requiring extensive and complex cavity repairs will be permanently restored to vigor and health when the work is completed and the owner should, therefore, understand that he is taking more or less of a chance before he spends a large sum of money.

Few readers of the Canadian Forestry Magazine who have not lived in certain sections of the prairie west can realize the seriousness of the soil-drift menace. Expert opinion is more and more accepting the conclusion that the most natural and most effective remedy can come only through the extensive planting of thick belts of trees to break the power of prairie winds. Our photographs show the plague of soil drift in action. Enormous damage has been wrought and each year witnesses no diminution of the evil.

Structure of a Tree.

To avoid making serious mistakes in repair work, it is necessary to have some general knowledge of a tree structure and the manner of growth. Upon looking at the cross-section of a tree trunk as the oak for instance, we may be able to distinguish four concentric circles. The dark centre area is the heart-wood with the lighter coloured sap-wood lying immediately outside it. Between the sapwood and the darker outer circle of bark lies a very thin and less well defined cambium layer. This thin layer is inconspicuous and can best be observed in a freshly cut cross-section made in the spring or early summer. Those of us who have made basswood or willow whistles in our childhood days, will recognize this cambium as that most slippery layer which made it possible to separate the bark from the twig. This is the most important part of the tree. When it dies the tree dies. It alone has the power to produce new wood and bark. During the growing season this tissue is constantly forming new wood next the sapwood and new bark under the old bark. Thus each year a more or less distinct ring of wood and bark is added to the tree. These layers of wood are the annual rings we see upon looking at the cross-section of a log or stump or branch. They are layed out throughout the whole length of the tree from the end of the tiniest roots to the tips of the smallest twigs. The cambium, it will therefore be seen, is the most active part of the tree and the remaining parts of the trunk or boughs may, in a sense, be considered dead. The chief function of the heart wood is to support the tree and give it rigidity. The sapwood also assists to support the tree but it also has the important function of conducting the raw mineral food dissolved in water up from the roots to the leaves. As the tree increases in diameter the sapwood nearest the centre gradually develops into the less active heartwood.

The outer bark of the tree merely acts as a protection to the cambium layer and wood within.

It will now be understood why it is possible to remove the centre or heartwood of a tree without causing serious injury except to destroy its rigidity. Old trees are frequently seen growing in which the centre of the trunk has largely decayed away, leaving little more than a shell. When new wood is formed at about the same rate the decay takes place, the condition may last for years. Sooner or later, however, the trunk becomes so seriously weakened that the first heavy wind twists it off.

Cause of Decay.

Decayed wood is the result of the growth of parasitic fungi. Discolored wood, hollow wood, jelly-like or leathery masses, toadstools or shelf-like projections frequently found attached to trees are an indication of the presence of such fungi. These fungi are plants of a very low order that send their mass of microscopic thread-like growths throughout the wood and feed on the contents of the wood cells or the wood itself. The part of the wood material that is left is discolored, fragile and broken. It is what is known as punky or rotten wood.

The Tragedy of the Buffalo

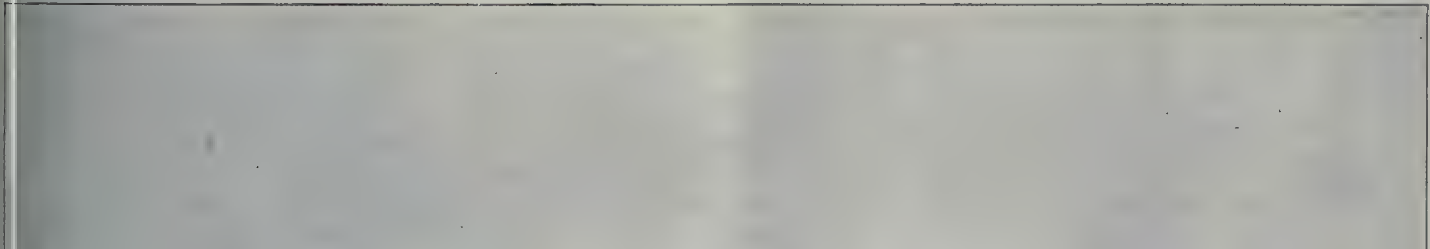
A Graphic Story of Canada's Wild Life Treasure that once Blackened the Plains Fifty Miles in Width—What the Future promises through Wholesale Domestication.

In all the long history of the dissipation of natural resources following the opening up of this continent no chapter reveals what man's greed and innate instinct for destructiveness can accomplish in a brief time better than the story of the extermination of the American bison. Never, perhaps, was a natural resource of equal magnitude so completely and rapidly exhausted. It is said that of all the quadrupeds that have ever lived upon the earth no species has existed in such enormous numbers and few have compared in value to man. Dr. W. T. Hornaday, the distinguished American Zoologist, declares that even in South Africa, which has already been exceedingly prolific in great herds of game, probably all its quadrupeds taken together on an equal area would never have more than equalled the numbers of buffalo formerly found on this continent. Yet in less than half a century the entire species was wiped out, entailing a loss to future generations impossible to calculate. The Indians of some tribes believed that the buffalo issued from the earth continually like grass. Like the grass the buffalo were indeed cut down, but unlike the grass, unfortunately they did not come up again.

Nature in her scheme for economy seems to have given to almost every part of the world some special gift for supplying the wants of the race which inhabit it. The Eskimo of the far north has his seal, the Korak of Siberia his reindeer, the native of Ceylon the cocoanut palm, all of which supply the main requisites of life. What was probably her finest gift,—the buffalo,—she reserved for the northern half of the continent. "With an acquaintance which includes fine living examples of all the larger ruminants of the world except the musk-ox and the European bison, a prominent American Zoologist declares, "I am sure that the American bison is the grandest of them all." For the Indians of the plains the buffalo spelled food, clothing and shelter. His flesh was as well flavoured and as nutritious as the finest of beef; his thick robe furnished covering and clothing for the bitter winter cold; his hide was used for teepees and boats; the horns were converted into spoons, caps, combs, bows, head-dresses and other ornaments; the horn-tips were used for blood-letting by cupping in surgery; the hair was woven into belts, lassoes and many other things of use and adornment; hoofs, horns and scraps of skin furnished glue, while from the bones were fashioned knives, weapons and many useful implements.

A Blessing to the Pioneer.

The part the buffalo played in the development of the country can scarcely be estimated. It is bound up with the whole story of the early settlement of the west. Without the buffalo the great privations and hardships of the pioneer explorers and settlers would have been rendered incalculably greater. There is no diary of early exploration which does not contain some tale of a happy relief from starvaion through a fortunate encounter with a herd of these animals. Pemmican—dried and pounded meat mixed with suet—formed one of the most nourishing of foods in a highly condensed form. Its "staying powers" and small bulk made it of inestimable value to the voyageur and overland traveller. In the absence of other food a handful of pemmican was sufficient food to constitute a meal and pemmican in the days of abundant



Monarchs of the Plains.

In Buffalo Park, Wainwright, Alberta.

buffalo sold for 2d. a pound in Winnipeg. The warm thick buffalo robe saved the life of many an early settler in a western blizzard. The hide formed the tires of his Red River cart in a country where iron was unknown. On the long trek across the prairie, buffalo meat, pemmican and wild fowl were his chief articles of food.

How many buffalo there were at one time on this continent can only be vaguely computed. The range of the species covered more than one-third of the entire northern half of the continent. Alvar Nunez Cabeza, a Spanish explorer, later known as "Cabeza de Vaca" or "Cattle Cabeza," who was shipwrecked on the Gulf Coast, west of the mouth of the Mississippi in 1530, reports seeing buffalo in large numbers in his wanderings through Texas. Samuel Argoll, an English navigator, in 1621 found "a great store of cattle as big as kine"near the head of the Potomac, probably only a few miles away from the site of the present city of Washington. Col. W. Byrd, who surveyed the boundary between North Carolina and Virginia in 1729, writes of the fortunate killing of a buffalo which Providence threw in their way just as provisions began to fail, adding feelingly: "It was the more welcome because it was change of diet. We had lived upon Venison and Bear till our stomachs loathed them almost as much as the Hebrews of old did their Quails." Other early explorers report finding buffalo in large numbers in the Carolinas, Virginia. Pennsylvania, New York, Illinois and Louisiana. Roughly speaking its range extended from the Atlantic Coast, west across the Alleghanies to the Mississippi, south to its mouth and north to the southern shore of Lake Erie. But the land across the Mississippi, the Great Plains of the West, indeed the whole country from the Rio Grande north to Great Slave Lake, was the true stamping ground of the buffalo. Here it found its natural home and multiplied to countless numbers. In Canada the buffalo was apparently never east of the prairie country. Its range seems to have been from Winnipeg to the foothills though Dr. Richardson, author of "Fauna Boreali-Americana," states that they crossed the Rockies following the pass where later the Canadian Pacific was to lay its railway, in sufficient numbers to constitute a feature of the fauna of the western side of the range.

Herds Blackened the Plains.

According to Hornaday, the geographical centre of the distribution of the species up to 1800 was south Central Nebraska; from 1800 up to the time of disappearance, the Black Hills of Southwestern Dakota. The herds of the east probably counted their buffalo by hundreds but the herds of the west by tens and even hun-

An Indian Buffalo Hunt.

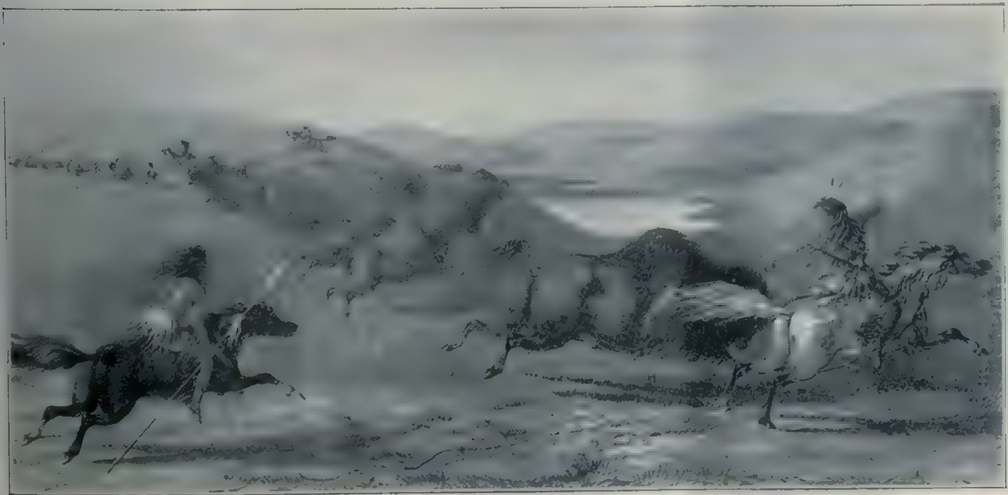
dreds of thousands. Dante's "Thick as the Leaves in Vallambrosa" and some of the classical descriptions of the hordes of locusts seem the only fitting comparisons for their vast numbers. Col. R. I. Dodge, in "Plains of the Great West," gives a graphic picture of a great herd through which he passed while driving from Old Fort Zara to Fort Larned in Arkansas in 1871. This herd was not less than 25 miles wide and 50 miles deep. It took five days in passing a given point. Looked at from an eminence, Col. Dodge says the whole vast space appeared to be one slow moving compact mass which completely covered the ground, drifting across the plain like a dark, irregular cloud. This was one of the last of the great herds. A careful estimate of its numbers shows that it probably comprised 4,000,000 buffalo and this was only one herd. Mr. Wm. Blackmore, an early westerner, quoted in the Great Plains of the West, said,—"In the autumn of 1868, whilst crossing the plains on the Kansas Pacific Railroad for a distance of upwards of 20 miles, between Ellsworth and Sheridan, we passed through an almost unbroken herd of buffalo. The plains were blackened with them, and more than once the train had to stop to allow unusually large herds to pass. In 1872, whilst on a scout for about a hundred miles south of Fort Dodge to the Indian Territory, we were never out of sight of buffalo."

"Unlike any other quadrupeds that ever lived" says Hornaday, "they lived and moved in great multitudes like grand armies on review." And like armies once in motion they went on regardless of everything. Boats, locomotives, trains of cars which came in their way—nothing halted their advance. It is said that after the train on one of the prairie roads had been derailed twice in one week by herds of buffalo, the engineer learned to bring the train to a stop until they had passed. It was this instinct for solidarity, coupled with an almost total absence of fear that helped to make their annihilation so fatally easy.

Herd of Buffalo in Buffalo Park, Wainwright, Alberta.

Systematic Slaughter.

The disappearance of the buffalo from the east was an inevitable result of the march of civilization. As the country became settled the buffalo gradually disappeared. He was the most valuable food animal procurable by the early settler and as soon as the consumption exceeded the natural increase, the buffalo was bound to go. Its extermination on the plains is a different story and a less creditable one. Up to the year 1820 although the buffalo had been gradually driven westwards and both Indians and whites had hunted it steadily for meat and robes, no serious inroads had been made on the western herds. About that year, however, the slaughter began to be systematic and organized. Trading posts were established at various points near the best hunting grounds and the Indians were encouraged to kill as many buffaloes as possible for their robes. About this time, too, began the famous Red River hunting expeditions, the annual buffalo hunt by which the Red River settlers secured their winter's provisions. Up till then buffalo had been so plentiful that when a settler wanted to stock the winter larder all he had to do was to drive out on the prairie and shoot down what he required and bring it home. Now, however, the buffalo were growing scarcer in Manitoba and organized expeditions prepared to go a long distance had to be fitted out. The first great hunt was made in 1820. It comprised 540 carts, put together without a nail, with tires of stretched buffalo skin and a squeak which could be heard a mile away. The long train of carts trekking across the prairies must have made an imposing spectacle and if the buffalo had been a timid or sagacious animal the noise would undoubtedly have given him ample warning to get away to safety. Unfortunately he was not. Alexander Ross in his "Red River Setlement" shos how the number of carts assembled for the annual hunt increased. In 1825 he says the expedition numbered 680 carts, with Indians, settlers and half-breeds. In 1830 there were 820. In 1835 the number had increased to 970 and in 1840 to 1,210. As Hornaday says, the army which finally went forth to slaughter the buffalo was larger than that with which Cortez subdued an empire. By 1846 it was necessary to divide it into two divisions. One, the White Horse Plains Division, went west by the Asiniboine; the other, the Red River Division south to Pem-


Indians Hunting Buffalo in the Old Days.

bina. These great hunts were conducted under almost military discipline with an elected leader and subordinate captains and policemen. The laws of the hunt were strictly defined and rigidly carried out and woe to the man who killed a buffalo before the signal for the general hunt had been given. If caught he was certain to be publicly and severely flogged if he did not forfeit his life.

A Process of Extinction.

According to estimates made by Prof. Henry Hind and others, the number of buffaloes killed by the Red River settlers and Indians from 1820 to 1840 was at least 652,000. Steadily the species was killed off and driven back until by 1820 it was extinct from Fort Garry (Winnipeg) down to the Cheyenne River, to which the Red River hunt had gradually extended. The White Horse Plains division had also practically cleared the country in which it worked and the half-breeds and Indians, who would never work if they could hunt, turned their eyes to the hunting grounds of Saskatchewan. In a few more years, in what had once been the rich hunting country between the two branches of the Saskatchewan, the buffalo had also been exterminated.

In the meantime the buffalo in the southern and middle western States were being steadily slaughtered by both Indians and whites. The danger of extermination was, however, yet a long way off. There were still millions left. In 1865 an event occurred which did much to hasten the action of the tragedy. This was the building of the Union Pacific Railway, the first Railway line across the continent. It passed through one of the most populous remaining buffalo territories and made the marketing of buffalo products easy and profitable. By a fatal coincidence, as Hornaday points out, this event was backed up by an unlimited supply of new and marvellously accurate breech-loading rifles and fixed ammunition, and then, he says, "there followed a wild rush of hunters to the buffalo country, eager to destroy as many as possible in the shortest time. For these greedy ones the chase on horseback was "too slow" and too unfruitful. That was a retail method of killing, whereas they wanted to kill by wholesale." The still or "sneak" hunt became the order of the day. Where it formerly took from 15 to 25 mounted hunters a whole season to kill 1,000 buffalo, a single still hunter with a long range breech loader could now kill from 1,000 to 3,000 in a season by his own efforts. Col. Dodge stated that he once counted 112 carcasses inside a semicircle of 200 yards radius all killed by one man from the same spot in less than three-quarters of an hour. Another writer says that he saw one of the best hunters kill 54 buffalo with 54 shots at one stand.

The famous Buffalo Bill's record was 4,280 buffalo shot by his own hand in 18 months. In the early days buffalo robes were sold for as low as a dollar, but as the demand increased the price rose to three and four dollars and the business became a lucrative one. Traders bought robes from the Indians at a price of a pint of whiskey, and once the latter had learned the taste of fire water a new incentive was added to their zest for the hunt. Often nothing but the robes and tongues were taken, the carcasses being left to rot by hundreds on the plains. Indeed after the buffalo were gone the gathering of bones for fertilizers and refining purposes became a profitable industry. Old sketches show some of the immense piles gathered together and awaiting shipment and they speak more eloquently than words of the enormous waste of valuable meat which took place.

A model of a pulp and paper town to suggest the industrial and municipal growth that are produced by the conserving of our own forest resources. This model is six feet long and five feet deep and was produced by W. C. Wilmore, of Ottawa, from photographs of the Espanola plant of the Spanish River Pulp and Paper Mills, Limited. The model, of course, does not pretend to do justice to the great dimensions of the Espanola mill. It is installed as one of the exhibits of the Canadian Forestry Association's "Forest Exhibit Cars" which has visited scores of communities this summer.

The White Man's Prodigality.

The inevitable happened so rapidly that even those who had the best reasons to know could scarcely believe that the buffalo were gone. In 1875 they were still numerous, in 1880 they were rapidly disappearing, by 1885 they were gone. By 1890 there was probably not a single wild buffalo left on the whole North American continent, with the exception of one herd which had wandered into the inaccessible region near Great Slave Lake, a herd which still exists and which for many years has been under the protection of the Canadian Government.

Speculations as to what "might have been" with regard to the buffalo are perhaps idle. Over the greater part of the continent his extermination sooner or later was inevitable. Once his habitat was invaded by settlement the buffalo had to go. His pasture grounds had to be turned into more valuable wheat fields. But there is no doubt that the end might, under a wise policy of conservation, have been considerably prolonged with great commercial advantage to the country and perhaps even indefinitely postponed. Much of the western Canada is by nature a grazing country. In the buffalo we had the ideal grazing animal—an animal, which could live where no other ruminant could, which could "rustle" for its own food summer or winter and which could face the severest blizzards. Experiments made with small herds in several parts of the country show that the buffalo can be domesticated or at least semi-domesticated without much difficulty. Whether great herds could have been driven out to the great ranching country of the foothills and north to the Peace River and guarded by range riders as the great ranches are to-day is a matter of conjecture. Twenty years from now when the experiments at present being made in connection with the government herd at Wainwright and in domestication by the University of Saskatchewan are carried out we shall be in a better position to figure up our national bill of loss.

INSTINCT VERSUS SCIENCE.

A party of foresters and surveyors were inspecting some difficult country when a heavy fog settled down on it, and they hopelessly lost their sense of direction. The day was closing in, and, in their anxiety to get back to camp before dark, they swung their compasses and discussed the way out, suggesting various cardinal points as the correct direction. Attached to the party was an aborigine, who, with open mouth and protruding eyeballs, listened to the party's wisdom. Presently the darkie remarked: "Well, genelmen, nebbor mind about Nor', Sou', East, and West, I bin goin' home." And he forthwith went. Needless to say, the rest of the party followed him and experienced no difficulty about getting back to camp.
—Australian Forestry Journal.

A Tree Three Million Years Old

By Dr. E. M. Kindle, Paleontologist, Ottawa.

The mountain climber finds it good to pause at times and look back over the route traversed. The hills and valleys left behind are seen to fall into some definite scheme of topography which was not apparent when he was in their midst, and to posseess a charm and beauty visible only from the vantage ground lent by distance. It may be equally profitable for the lover of present day forests once in a while to glance back over the geologic trail which the evolution of modern forests has followed. He will find much of the trail of evolution concealed in the obscurity of remote geologic time, but here and there it is clearly outlined by the fossil remnants of ancient forests, many of whose species have long been extinct.

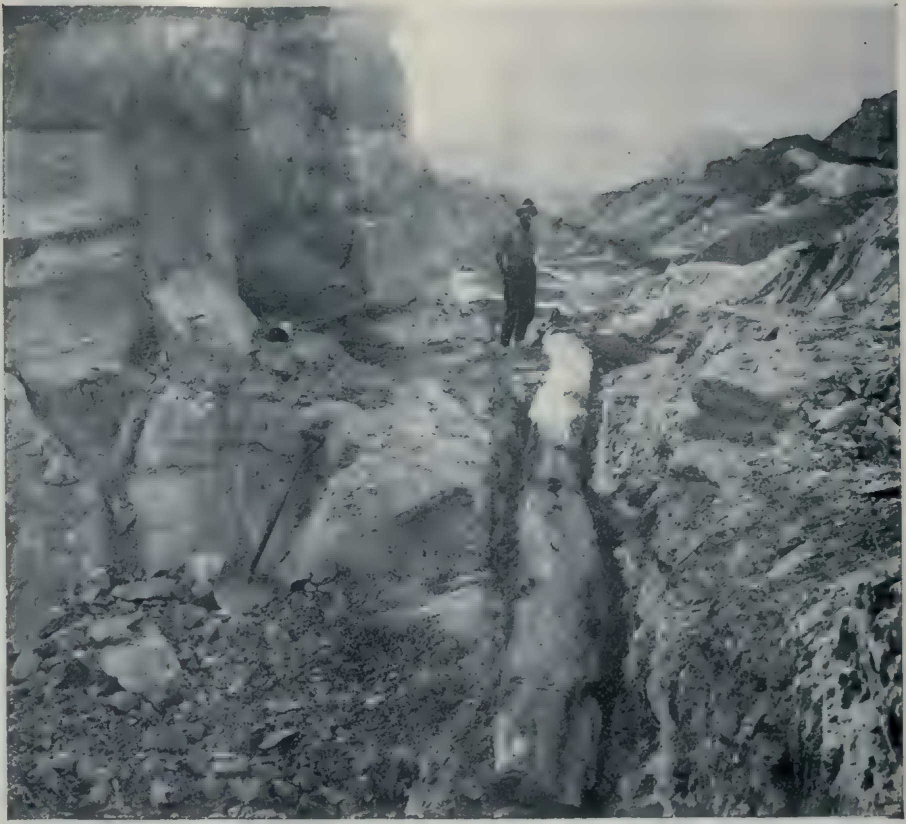


Fig. 1—A fossil tree, Red Deer Valley, Alberta, that flourished three million years ago, and in the shade of which lived the giant dinosaur. This is the largest fossil tree in America and now reposes in the National Museum at Ottawa.

Fossil forests can of course appeal only to those who wish to know how living forests came into existence. They have little to offer the man who can see in a living forest only so many thousand feet of lumber, material for pulpwood or the possibility of a new source of cattle feed in the shape of "hydrolized saw-dust." These of course are important assets of our forests, but their most important assets accrue only to the man whose eyes are not too closely focussed on the dollars which they may yield. It is to the nature lover who can see in forest aisles, gothic cathedrals, which to many eyes are in-

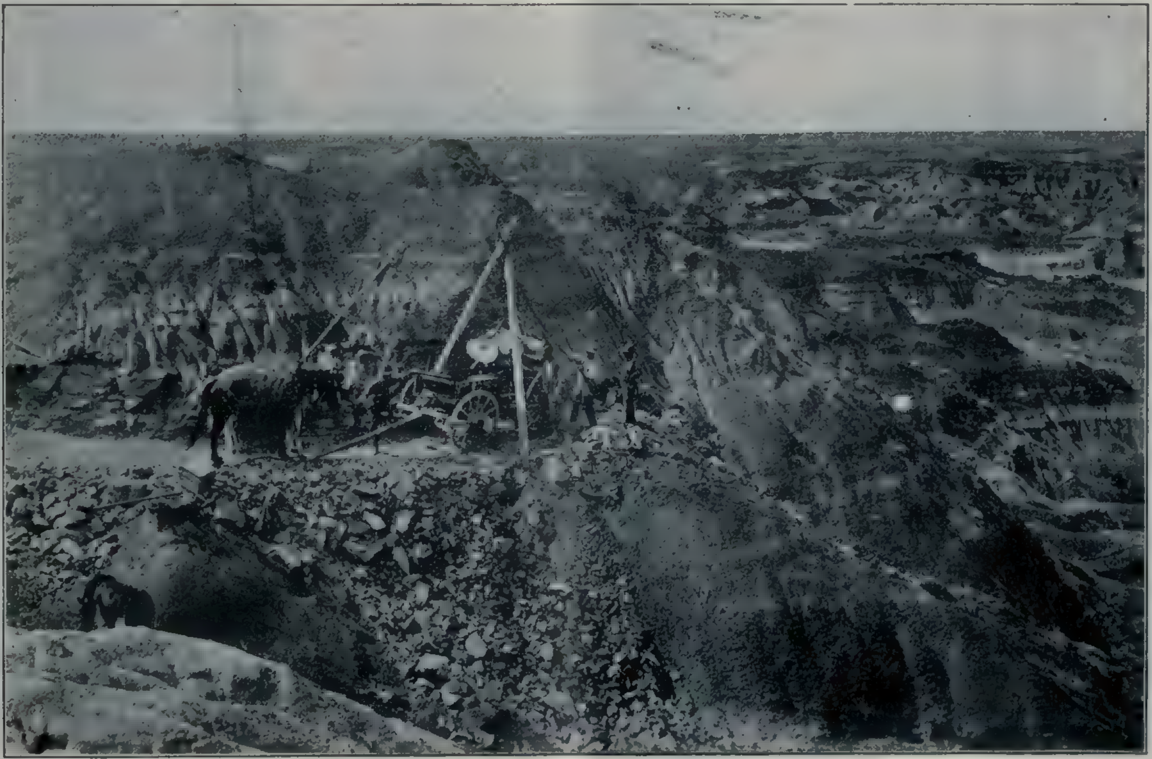


Figure 2.—The 30-foot skeleton of Gorgosaurus was taken up in five sections, the largest of which weighed over a ton. The sections, consisting of the bones held in place by the sandstone matrix, were swathed in burlap dipped in plaster of paris, perparatory to being packed in strong boxes and taken by wagon over the prairie to the nearest railway station. In the above view a section is being lifted by block and tackle into the wagon for removal to the prairie level.

visible, and who finds in the beauty of her forests Canada's greatest wealth, that the forests yield their real treasures. The ancient history of her living forests as revealed by fossil trees, can hardly fail to interest those who have in any degree this viewpoint, or that of Wordworth as express in the following lines:—

"One impulse from a vernal wood
"May teach you more of man,
"Of moral evil and of good,
"Than all the sages can."

In Canada we may enjoy the beauty and inspiration not only of living forests, but the fascination of seeing forests which flourished in ages long past if we choose to.

Treasures in the "Bad Lands."

On the plains of western Canada we have a veritable wonderland where not only the forests but the animals which lived in them in Cretaceous times have been fossilized and preserved. This geological wonderland is located in the Red Deer Valley in Alberta. The unique character of the "Bad Lands" scenery in which these records of an ancient and long vanished geography are found is as striking and impressive as the fossil trees themselves.

A fossil tree from this ancient Alberta forest, 52 feet in length has recently been placed on exhibition in the Canadian National Museum, (Fig. 1). This tree was discovered and collected by a field party of the Canadian Geological Survey. In length of trunk this tree surpasses any other museum specimen in North America. The American Museum in New York City has a fine specimen from the same fossil forest 45 feet in length. The trunk which is completely silicified and perfectly preserved, was embedded in Upper Cretaceous rocks which are approximately three million years old. The limbs are missing, but the points where they were joined to the trunk are clearly marked. A film of coaly matter on the under side of the tree indicates the former presence of bark. The upper surface which had been long exposed to the weather owing to the disintegration and disappearance of much of the original rock cover long before the tree was found has the appearance of a weather beaten tree trunk which has lain long in the woods. The cells of the wood are filled with chalcedony. The weathered part has the lignite or original woody fibre all removed, and mostly replaced by chalcedony. The trunk was originally round, but has been slightly flattened by the pressure of the overlying rock, probably during the process of changing the wood into lignite, and before the filling of the cells with chalcedony had gone very far.

The outer layer of coal or lignite probably represents chiefly the bark of the tree. Dr. W. D. Matthew has pointed out that "the bark does not silicify so readily as the wood of a tree because the wood is made up of innumerable small tubes running up and down its length. These convey the sap while the tree is alive, drawing it upward by capillary attraction; after the tree is buried in sand and mud, of a lake stream, they may equally draw the mineral-bearing waters through from end to end of the tree and thus aid in depositing the mineral that petrifies the wood. But the bark does not have tubes or cells of this character, the mineralized waters are not drawn through it, and it remains lignitic, soft and crumbling when exposed to the air."

What Fossil Trees tell us.

Such a tree raises various questions and inspires many reflections. Did it live in a forest like our modern forests? How did this tree escape the decay which overtakes and completely obliterates in a few years the trees which die in our present forests? Did the creatures which enjoyed its shade and sought their prey beneath its branches resemble those we know to-day? What can fossil trees like this tell us of the climate of ancient Alberta?

These and many other problems are suggested to the Museum visitor who looks at this fossil of an ancient Alberta forest.

The dawn of modern floras appeared in the Upper Cretaceous times represented by this tree trunk. The Lepidodendron and Sigilaria forests of the Coal Measures had disappeared long before this. The great changes in the character of vegetation which took place during Triassic and Jurassic times lead up to a flora in the Upper Cretaceous age which included many generations still living.

Some of the more characteristic features of the Upper Cretaceous flora may be given in the words of Sir William Dawson:—

"The cycads, with their simple, thick trunks, usually marked with rhombic scars, and bearing broad spreading crowns of large, elegantly formed pinnate leaves, must have formed a prominent part of the vegetation of the Northern Hemisphere during the whole of the Mesozoic period.

"The pines present some features of interest. In the Mesozoic we have great numbers of beautiful trees, with those elegant fan-shaped leaves characteristic of but one living species, the gingkotree of China. It is curious that this tree, though now limited to eastern Asia, will grow, though it rarely fruits, in most parts of temperate Europe, and in America as far north as Montreal, and that in the Mesozoic period it occupied all these regions, and even Siberia and Greenland, and with many and diversified species."

Another group of trees conspicuous in Cretaceous forests were the Sequoias. "The genus **Sequoias** limited at present to two species, both Californian, and one of them the so-called "big tree," celebrated for the gigantic size to which it attains, is represented by species found as far back at least as the Lower Cretaceous, and in every part of the Northern Hemisphere.* It seems to have thriven in all these regions throughout the Mesozoic and early Kainozoic, and then to have disappeared, leaving only a small remnant to represent it in modern days. A number of species have been described from the Mesozoic and Tertiary, all of them closely related to those now existing.

"The Sequoias form large forests in California, which extend along the coast as far as Oregon. Trees are there met with 300 feet in height and 20 feet in diameter. We know only two living species of Sequoia, both of which are confined to California.

"If we go back into the Tertiary, this same genus meets us with a long array of species. Two of these species correspond to those living at present. But, while the living species are confined to California, in the Tertiary they are spread over several quarters of the globe.

"In the Tertiary there have been found fourteen well-marked species, which thus include representatives of the two living types, **Sequoia sempervirens** and **Sequoia gigantea.**

"We can follow this genus still further back. If we go back to the Cretaceous age, we find ten species.

"Altogether, we have become acquainted, up to the present time, with twenty-six species of Sequoia.

"This is, perhaps, the most remarkable record in the whole history of vegetation. The Sequoias are the giants of the conifers, the grandest representatives of the family; and the fact that, after spreading over the whole Northern Hemisphere and attaining to more than twenty specific forms, their decaying remnant should now be confined to one limited region in western America and to two species, constitutes a sad memento of departed greatness. The small remnant of**S. gigantea** still, however, towers above all competitors as eminently the "big trees"; but, had they and the allied species failed to escape the Tertiary continental submergences and the disasters of the glacial period, this grand genus would have been to us an extinct type. In like manner the survival of the single gingko of eastern Asia alone enables us to understand that great series of taxine trees with fern-like leaves of which it is the sole representative.

"Besides these peculiar and now rare forms, we have in the Mesozoic many others related closely to existing yews,

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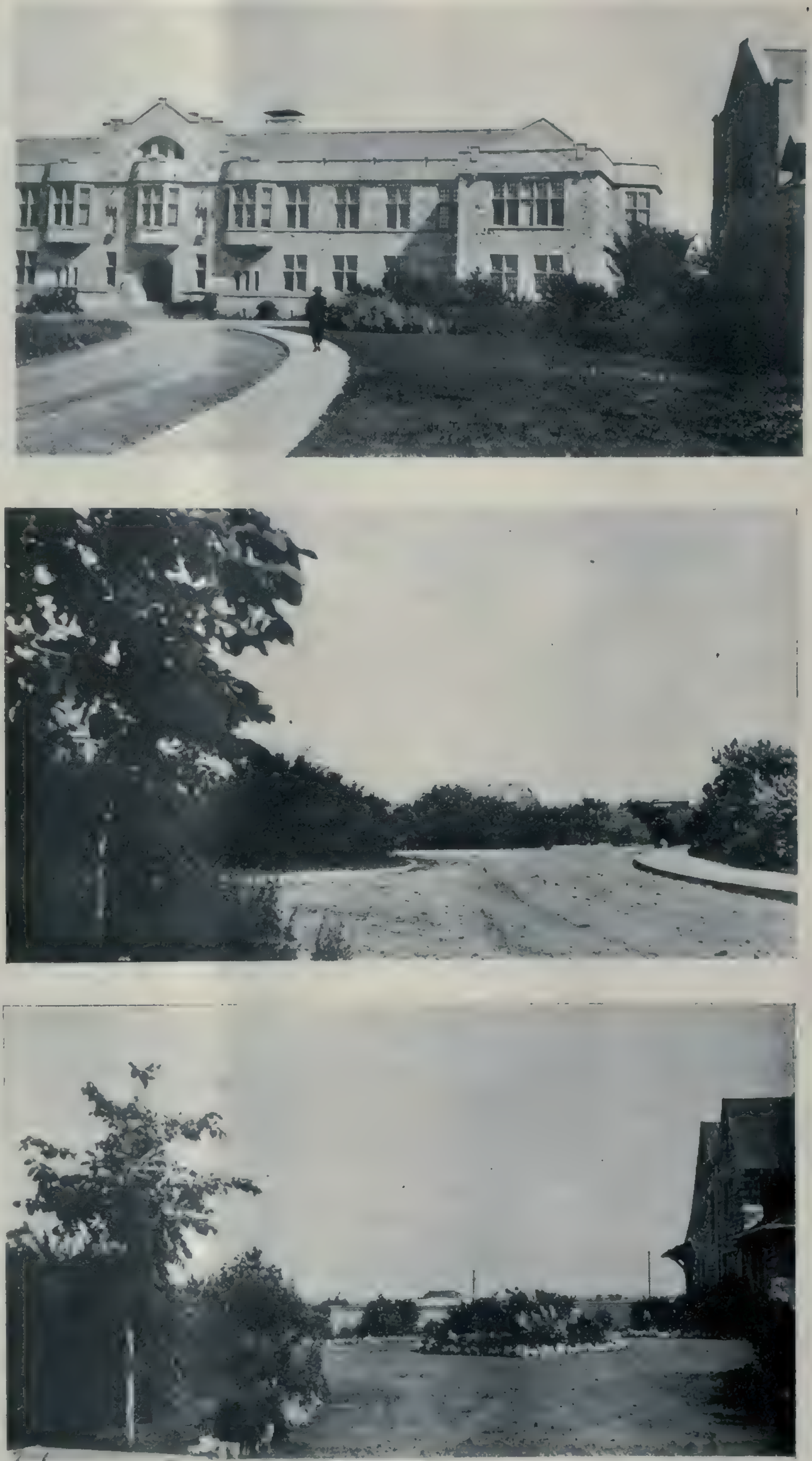
*In the Eocene of Australia.

(Continued on page 408)

A Prairie University Invests in Beauty

By Archibald Mitchell.



Set out on absolutely flat prairie, with few natural advantages the University of Saskatchewan at Saskatoon has followed the praiseworthy policy of adorning its walks and grounds by the generous planting of trees and shrubs. The buildings of the University in themselves are beautiful but without the aid of trees would have seemed uninviting enough. Note from the above photographs the enriching and humanizing effect that trees invariably give to prairie buildings and grounds.

One of the most striking methods of inculcating a love of the beautiful in the people of the prairies is the grounds of the University of Saskatchewan at Saskatoon. There the fine, substantial, chaste-looking buildings are set in groups of splendid shrubbery through which the drives and walks wind between the different buildings, linking them up directly and yet observing those beautiful curving lines of landscape so rarely seen in such institutions.

Agriculture is the basic industry of Saskatchewan, and its recognition as such has been thoroughly emphasized in the teaching of the University, for the science of Agriculture is the principal course there and nothing is spared to make it so.

Young farmers and farmeresses to the number of 1,200 attend these classes during the year and if there is anything in the theory that environment counts for much in the moulding of character, then here, in the midst of the trees and shrubs, flowers and lawns of the grounds of the University is the place where the future leaders of the Province will unconsciously as well as consciously, absorb that love for the beautiful in home surroundings that is so valuable, and in which the west is so woefully deficient.

Returning to their homes these young people cannot fail to carry with them a realization of the possibilities in home improvement there, the planting of trees and shrubs and of the true principles to be observed in carrying out these improvements. It means a great deal to the future home makers of the province.

As a small instance of how short sighted in such matters people can be, we had the pleasure of visiting several other similar institutions lately. Splendid places with wide sweeping lawns and trees and shrubs too, but there were foot-paths here and there across these fine lawns leading from one hall to another; foot-paths made by the hurrying feet of students rushing from class-room to class-room, or from class to residence, an eyesore to the visitor and a bugbear to those in charge. It is a far cry to the days when the monks of old decorously paced the rectangular courts and avenues of the old Universities. They had plenty of time then to go around the corners, and they did it with all the dignity appropriate to the place and occasion. Now-a-days, we are in a different world, and besides classes there are fraternity meetings, literary meetings, athletic meetings, etc., of all sorts to be attended and young people have not the time to pace around the corners of dignity. They want to get there, and so the lawns were criss-crossed with footpaths. At Saskatoon they have wisely recognized this and also the fact that only two things can prevent students—or anybody else—from making footpaths, and these are either by presenting an insurmountable obstruction or to provide a properly made walk. This has been done at Saskatoon and there are walks or roads convenient to every place. None of the dignity so desirable in such a substantial institution is lost, and a most valuable lesson in simple and effective landscape arrangement is certainly set before the students. Dean Rutherford takes great personal interest in the grounds.

FROM A CHIEF FIRE RANGER.

Hearst, Ont. "I look forward to getting your magazine each month and after reading it pass it on to others. It is a great help to me in many ways."

To the casual observer on a railway train, there appears sometimes to be very little tree planting observable on the "bare prairies." The records of the Dominion Forestry Branch show, however, that fifty thousand plantations have been formed from stock supplied by that branch. There is a very large number of other plantations of which no official record exists. The photograph shows the fine shelter belt of Mr. Kelly at Naseby, Saskatchewan, which has enabled him to grow an abundance of vegetables.

Benefit of Tree Planting on Prairie Farms

In many sections of the prairies a grave error is being made in destroying entirely the natural bush and reserving nothing for future protection of the farm buildings and crops. Some day the error will be regretted and strips of trees will have to be restored by artificial planting.

Near Melfort, Saskatchewan, where an intelligent interest in the value of shelter belts is clearly manifest the native bush is being conserved along roads and on parts of the farm. This is sound policy.

There are several ways in which plantations of trees benefit the prairie settler, the most important of which are the following:

1. They afford shelter from the wind to crops, buildings, and stock.

2. They collect and hold the snow during the winter, preventing it from banking up around buildings.

3. They preserve and retain the moisture in the soil by breaking the force of the hot winds in summer, thus retarding evaporation. The snow also held by them in the winter, melting in the spring, furnaces a great deal of moisture to the land in the immediate vicinity which otherwise it would not retain.

4. Plantations will supply fuel, fencing material, and wood for repairs. If settlers would only realize that they can grow their own fuel and fencing material, as they undoubtedly can, many more plantations would be set out, as this would mean to them a great saving in time and labour.

5. They are of aesthetic value, beautifying the landscape and making life on the prairie much more pleasant and less monotonous.

6. They greatly add to the money value of the farm. There is not the slightest doubt that a farm which had on it a well managed and productive woodlot of a few acres would, other conditions considered equal, sell for far more than one without trees.—Norman M. Ross, Dominion Forest Nursery Station, Indian Head, Sask.

FROM THE PREMIER OF ONTARIO.

To Canadian Forestry Association: "I am greatly interested in this work and I wish you every success in your tour throughout the different districts of Ontario."

This Saskatchewan farmer takes advantage of his shelter belt to provide "an open air implement shed," as he describes it. At least his implements are protected from wind on two sides, and his farm derives many other material benefits.

How to Eliminate Grass in Prairie Shelter Belts

By Archibald Mitchell, of the Western Staff of the Canadian Forestry Association.

A question that comes up continually is that of grass in the plantations.

"What can I do to get rid of grass among my trees?"

"What have you tried for it?"

"Well, I have tried to hoe it out but it just seems to make it worse, and you can't plow it, the trees are too close."

"Have you ever tried mulching it with straw?"

"Yes, at least I have covered it with manure but it does no good."

"When did you apply the manure?"

"I put it on in the winter, just as it came from the stable."

"Suppose now, you had a fine rose bush, or a bunch of rhubarb or something to keep over winter, how would you protect it?"

"Oh well, I suppose I would mulch it with manure."

"Of course you would, and the mulching would protect it too. It would come out in spring in fine shape. Now, don't you think if a mulch protects a rose bush over winter it would be likely to do the same for a perennial grass, such as the "blue joint?"

"Well, it does seem reasonable."

"Yes, a winter mulch protects the grass, while a summer mulch destroys it."

"The best time to apply the mulch is about the middle of June, when the grass is in the flush of its growth. And use plenty of straw, ten inches to a foot deep, sufficient to smother it up and keep out the light."

A daily event at the Tree Planting Car of the Canadian Forestry Association in its visits to prairie communities. The school children march to the car and enjoy heartily an hour's description, through word and picture.

"Why sure" says another man "I remember laying a door down on the grass when it was growing, and when I lifted it a month later, the place was all black where it had been lying."

Yes, that's it, a summer mulch rots the grass, and the way to kill it among your trees is to apply it about the third week in June.

Many a plantation throughout the country is today in bad order just from the want of this kind of mulch, and many a one that has been abandoned as a hopeless job, would have been saved if straw had been applied in time, and at the right time.

When to Defeat the Grass.

Remember the right time is the month of June.

One objection to the use of straw mulch in a plantation is the fact that mice sometimes find a lodgment there, and damage the bark of the trees. While this is perfectly true, it is also just as true that many plantations are flourishing because of the straw mulch and without any injury from mice.

Indeed, so important is this matter of a straw mulch, that many a plantation is destined to become completely ruined by grass unless this method of giving it a new lease of life by smothering out the grass in June is adopted. If mice are likely to be plentiful, the straw can be raked back from the tree stems before winter."

A parallel question that is often asked is "How soon in the life of a plantation may the mulch be applied?" The answer to that is, anytime after the second or third year, but it must be applied in June if it is to kill grass.

Your Initial Preparations.

Grass in a plantation is usually a sign of poor preparation previous to planting and the lack of information regarding its nature and the danger of allowing it to

Does the Public Respond to the Canadian Forestry Association's Campaigns? Here is a typical Audience Waiting for Our Cars to Open the Doors.

gain a footing in the plantation after the trees are planted. Naturally it takes time to get well established, and there is always ample time to check it when it is just beginning if it's nature is understood. Usually too, this attempt is made, but it is done the wrong way. The hoe or the cultivator are used, and these, while they do dig up some of the roots, in reality only serve to aggravate the trouble by chopping them up into small pieces which immediately begin to grow afresh and so the area affected is enlarged. The only safe way to check grass is to fork it up when it first appears and throw it away. Then it is done with. And it is not such a big job either, for the roots are only about four or five inches beneath the surface of the ground.

These little centres of grass spread throughout the plantation are the result of improper sod rotting the year previous to planting. Little pieces of the roots have managed to survive, and form the centres of the trouble. There are never many of them to begin with and they are easily removed if taken in time.

But the grass-spread often, and indeed usually, comes in also from the two sides of the plantation. This can be hindered quite materially by plowing a furrow 9 or 10 inches deep, along the edge of the grass after the planting is done, throwing the soil in towards the trees. In time, the grass will work its way in, but meantime the plantation has become established and the trees are big enough to escape serious damage from mice when the straw smothering-mulch is applied.

How the West Regards the Tree Planting Car

Compeer, Alta.

As a Representative of this Community permit me to express our sense of obligation to the Canadian Forestry Association that has made possible this visit of the Car. We have enjoyed the service rendered much, and would appreciate another visit at some subsequent date when other citizens may have an opportunity of hearing the instructive and interesting lectures and see the fine set of pictures.

The members of the staff with the car have done their work efficiently and well, being cordial and considerate in their attitude and willing to help in matters under consideration. The lectures were given in a manner creditable to the Association and the demonstrations were clear and enlightening.

This "note" is altogether unsolicited, but we wish to acknowledge our appreciation of the efforts of the organization to encourage better agricultural conditions and add a little of the aesthetic to the homes of our people. (Sgd.) Rev. Percy Halstead, Pastor.

PERDUE'S VERDICT.

Canadian Forestry Assn.

PERDUE, Sask., July 25th, 1921.—At a meeting of the Directors of the Perdue Agricultural Society held on 23rd inst. a resolution was unanimously passed, instructing me to write on behalf of the society, to express the appreciation and satisfaction which was derived from the visit of the "Tree Planting Car" which visited here on July 6th.

I may say, that not only the members of the Society, but every one who attended the exhibition and lectures were well pleased and interested in the discussions, etc.

The Society hope that you will be able to make arrangements to again visit our district on some future occasion, when I can assure you an appreciative audience.

Again thanking you on behalf of the Society.

FRED. J. BATRITE,
Secy.-Treas.

FROM A SASKATCHEWAN DOCTOR.

Should have written to you before to thank you and the Directors for having sent the Forestry Car to this place. Some who at present have no trees are going to plant. One man in particular and a bachelor at that, intends to plant over a mile strip and is getting his neighbours to do the same. He told me the other day that if all these fellows will do it we will make a change in the looks of this part. I might add that the land about him does not drift.

I spent several hours with Messrs. Mitchell & Cooch, and from the former learnt much about wind breaks. Though I have no land myself I could well see the advantages of tree planting. Their task is a hard one to try to make men put in trees in this country where all seem to be after the easy made dollar and do not look to the future. I presume the only thing to do is to keep at it and in time you will bring trees.

Yours truly,
F. JOHNSTON.

A TYPICAL DAY'S WORK ON THE TREE PLANTING CAR.

(From the Car Diary).

Nanton, Alberta: Worked in car all morning and had numerous callers. Amongst those who called were Mr. John Glendinning, ex-M.L.A.; Rev. Mr. Lytle, and Mayor Holmes. There were also a number of farmers and one or two of the Councillors. Mr. Mitchell visited the town and advised different people about their tree and shrub planting.

The school children came over in two lots. Total audience, 287.

The evening lecture brought out 140 people and scores could not get into the lecture car. Many questions asked, all characterized by keenness and intelligence. Lectures lasted until after eleven. Everybody except those having children in their care remained to the very last.

A MOST PECULIAR CASE.

By Douglas Malloch, the Lumberman Poet.

There was a man in our town
With seven children that
Inside a box-car settled down
And used it for a flat.

Demurrage was not much a day,
But rent? My lord, my word!
In fact high rent he wouldn't pay,
And so this man demurred.

The railroad, tho, at last declared
The man would have to move.
The man refused. To court they fared
The law and fact to prove.

"You can't evict him," said the judge,
"But you your car can haul;
And, if the man declines to budge,
Can move him car and all.

"And, if he boards aboard your car,
The law relief affords—
For you can charge whatever are
The usual rates for boards."

And so an engine took the car
And switched it to the line.
The fellow said, "Ho-ho! Har-har!
This travelling is fine."

But now his family was freight,
From father down to pup.
The railroad charged the lumber rate,
The rate soon ate him up.

FROM PERTH, N.B.

In enclosing his cheque for membership and subscription of a friend, Mr. C. O. MacDonald, Manager of the Royal Bank at Perth, N.B., writes: "It is always a great pleasure for me to bring to the attention of any friends the excellence of your work and of your publication, both of which I have seen demonstrated."

HOW MEMBERS VIEW IT.

From a member in Briercrest, Sask.: Enclosed please find postal note to pay my membership fee. It is with the greatest pleasure I make this contribution.

FROM HON. JACQUES BUREAU.

Three Rivers, P.Q. "I am heart and soul with the object of your association and think that everybody ought to join and try to make it prosperous and put it into a position to extend its operations as it is doing a world of good for Canada.

FELLOW MEMBERS! THIS CALLS FOR YOUR PERSONAL DECISION!

A Plan to Enlist Young Canada in Tree Planting

A Nation-wide Essay Competition to Rouse the School Children to Action in a Practical Form of Timber Conservation.

The modern Canadian farm is land plus—

Good land plus a good farmer plus a good working plant.

The working plant includes a wooden house, wooden furniture, wooden barn, wooden fence posts, wood fuel, wood for implements, wood for annual repair.

Every Canadian farm whether on the southern prairies or in northern Ontario should possess one of nature's automatic wood factories, which the farmer calls a bush lot, or a wood lot. It grows on soil or in locations otherwise unproductive. It requires a minimum of care and gives abundant returns for the time and labor investment. But the farm wood lot does need some care, some intelligent programme applied to it.

The average farm wood lot in Eastern Canada is loafing on its job. Wheat and oats are giving higher and higher yields per acre. The wood lot is giving less. Should this be so? A lean wood lot means only that the owner's wood requirements must be satisfied at a distant lumberyard by cash payment. His farm profits, his farm conveniences, not to mention the beautifying amenities of bodies of trees, are needlessly sacrificed.

Farm Forestry is Due for a Revival.

The Canadian Forestry Association wants the views of its members on a project for enlisting the school children of Canada in a farm forestry competition. The first stage will be a competitive essay for prizes. It will be operated through the schools and will stir up general inquiry and investigation and open the way for the spread of helpful information.

We Want your Personal Opinion About the Plan.

Is this plan valid? Is it practical? Will it give results of positive benefit to Canada?

Many an elaborate plan gets launched on waves of effervescence and the impulse dies right there. This is not the way of the Canadian Forestry Association. If the plan is adopted—and that is for you to say—it will be given effect immediately. The Provincial Governments and their Departments of Education, their Forest Services will be asked to join hands, for we will need a clear path to the schoolroom and the home of every senior school boy and girl in the Dominion.

Each Province a Unit.

The first stage will be the organizing of an essay competition, Dominion wide in its application. The subject cannot be identically phrased for all provinces, because of the fundamentally different forestry conditions. The preservation of existing trees as a source of wood supply, and the planting of new trees will, in general, represent the topic with which Young Canada will wrestle.

On the basis of "first things first," the competition will confine itself largely to economic considerations, namely the preservation and improvement (or re-establishment) of the farmer's wood lot from the point of view of commercial utility. In the case of the majority of school children on the southern prairies, most prairie tree planting has been done to beautify home surroundings and to protect stock, and crops against wind damage. So, the essay, as concerns the prairie provinces, will assume a special form, emphasizing the planting of trees for shelter belts purposes.

This does not sound as simple as the usual child essay on some topic of patriotic sentiment, such as love of flag, or military sacrifice. Nevertheless it is so identified with local interest and local need, so close to the human fondness for things that grow, that none need apprehend other than an enthusiastic response from Canadian boys and girls.

The Prize Money.

Then the sporting instinct for a competition! We all share it. To compete and perhaps to win! The distinction of winning will be great enough and the prizes substantial enough to give the movement the proper impetus. Each of the nine provinces will be allotted five prizes of $25, $20, $15, $10, and $5.

Comprehensiveness of treament, and intelligence shown concerning the local forestry situation will govern the award. The length of essays will be limited to 1,000 words, less than a newspaper column.

The whole scheme narrows down to a question of stimulating a nation-wide spirit of enquiry concerning the forest resources, a nation-wide recognition that to burn down and cut down millions of trees year after year, without replacement, invites an ultimate disaster. When the timber supply of Canada fails, agriculture, mining, all branches of manufacturing and transportation will cease to operate. Canada's present peril has been similarly disregarded by other great nations. Spending from the "bottomless purse" of forest resources, they have reaped consequences from which our Dominion must be safeguarded at any cost.

The Children Hold the Future.

What will be the probable effect of the proposed competition upon the cause of forest conservation, upon reforestation of waste lands, upon farm forestry, upon tree planting on the northern prairies?

Tomorrow's public policies are being formulated today by the children in our schools. What forestry will amount to in 1930, whether timber conservation will be realized in action, whether living and crop conditions on the bare prairies will be enhanced by the presence of hundreds of millions of planted trees—the answers to such questions are being written in terms of finality this year, this hour, by the army of Canadian boys and girls.

A boy's first world is his home, his school, his few miles of land and woods and water within vision. Let him start his forestry right there. He has a problem at his back door. His father's wood lot (or "bush lot") is all too commonly the out-at-elbows member of the farm family. The best trees have been cut down; the crooked and diseased specimens left. Cattle or sheep graze under the branches and few young trees get a chance to live through a summer. This subject of the farm wood lot will provide the chief subject of discussion for Eastern Canada and British Columbia, for the farm is a voracious consumer of wood materials, three quarters of the entire production of our sawmills throughout America being used for farm buildings and repairs, fence poss, fuel, implements, etc.

After the essay competition has been completed, what? Will the newly-aroused interest in Forestry be permitted to die?

The Second Step.

By no means. The essay competition is a first and essential step, leading to a second national competition in which the boys and girls translate into action their special instruction and newly-acquired interest.

However, the second stage is not our immediate concern. It will follow naturally, probably in 1922.

The Essay Competition should get under way this Fall.

Member! We have a question to put to you. The Canadian Forestry Association is your organization. It is supposed to express your wishes. Will you say, by a mark of your pencil, whether you approve or disapprove of the project as herein set forth? Please tear off the coupon and mail today:

TO THE MEMBERS FROM THE PRESIDENT

To the Members of the Canadian Forestry Association:

Judging by the expressions commending its work, there can be no doubt that the years of effort of the Canadian Forestry Association appeal strongly to all those interested in conservation of the forest.

The two lines of accomplishment mentioned are:—

(1) Propaganda work against fire.

(2) The tree planting work.

In considering carefully their future course, your directors have decided that something additional is needed now, viz:—

"The Re-forestation of the Country Wood Lot."

By this, is meant, not the "timber limit," but the small portions of standing forest on farms, etc., undergoing the ordinary process of depletion.

Various suggestions have been made of methods to accomplish this, and among them has appeared the interest of the rising generation in the conditions in which they will live in after years. A naturally following thought is: why should not the school girls and school boys, each locality with its peculiar needs in mind, be able to tell that Great National Institution, the Canadian Forestry Association, what ought to be done, in order to provide trees on their farms for the years to come.

Old and young throughout life compete for the various prizes that life affords, (call them what you wish), why then, should not the school children of Canada compete for reasonable prizes for the best essay on how to reach this result in his or her particular locality.

The Canadian Forestry Association gains its best results by the "Team work" of all its Directors and all its members.

If the scheme briefly outlined above, is good and appeals to the members, please tell the Secretary so. If you don't approve of it, please say so. The majority of the replies will decide.

Your advice is needed, kindly give it.

For the Directors,

C. E. E. USSHER,

President, Canadian Forestry Association.

(TEAR OFF HERE AND MAIL TO-DAY.)

CANADIAN FORESTRY ASSOCIATION.
224 Jackson Building, Ottawa, Canada.

As a member of the Association I {approve / do not approve} of the plan to stimulate an interest in farm forestry on the part of Canadian school children through an Essay Competition.

Remarks ______________________________

Name ______________________________

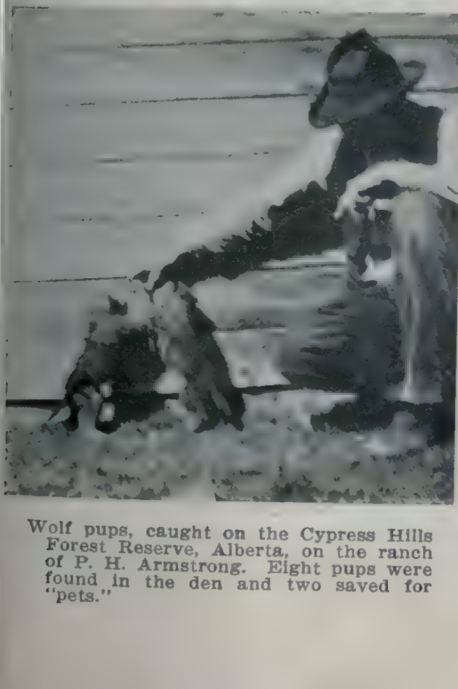
Address ______________________________

Timber Areas and Timbers in Australia

By C. E. Lane-Poole, Chief Conservator, Perth, W. Australia.

In the article appearing in the issue of the "Canadian Forestry Magazine" for aMrch 15th of the current year, some of the references in regard to Australia are scarcely in conformity with the facts of the case, and the writer of the article has done but scant justice to some of the prime timbers of Western Australia. It is stated that "in Australia there are 70 million acres of timber of more or less commercial value." If in this estimate are included those areas on which a few trees sparsely segregated are to be found, possibly the figure is within the mark. Indeed it is safe to say that it is a good deal under the mark. But between Savanah timber land and forest land there is a wide gulf fixed and of forest lands, using the word in its proper sense, Australia unfortunately has no such area as 70 million acres. At an Interstate Conference on Forestry held at Perth in November, 1917, at which representatives of the Forest Administrations of every State were present, the questions of the forest area of the Commonwealth and of the minimum that was economically demanded if Australia were to continue to produce timber in the future as it has done in the past were discussed. One Chief Forester, in the course of discussion, put it this way:

"The position seemed to be somewhat as follows: Victoria had about 4,000,000 acres of State forest, New South Wales proposed to have 5,000,000, and might perhaps obtain 6,000,000. Queensland had 1,000,000 acres of State forest and 3,000,000 acres of temporary reserves. Much of the latter was of very little value for forestry, having been reserved many years ago, because the land was considered not suitable for settlement. They could afford to alienate some of that, and must endeavour to find more forest land in other localities, but it appeared impossible to obtain more than 4,000,000 acres of forest land for Queensland. West Australia apparently cannot look forward to more than 4,000,000 acres, while South Australia's area is too small to take into account in the calculation. This makes a total of 18,000,000 acres exclusive of Tasmania."



Wolf pups, caught on the Cypress Hills Forest Reserve, Alberta, on the ranch of P. H. Armstrong. Eight pups were found in the den and two saved for "pets."

Estimates Now are Lower.

These figures may be regarded as authoritative but, since they were published, a classification survey has been made of Western Australia forests, and it is doubtful at the present moment whether the total area of Crown forest will exceed 3,000,000 acres. The task towards which every Forest Department in the Commonwealth is now applying itself is that of increasing this area, and that this will be accomplished in time can scarcely be doubted. A good deal, of course, will depend on the extent to which land that really ought to be forest land may be alienated for other purposes, farming, etc.

The eucalypt, take the species all round, is a tree that attains dimensions much beyond the average obtaining in Europe or in America, and there are giants among the eucalypts. The karri of Western Australia, for instance, frequently reaches a height of over 250 feet and one measured not long before this article was written was found to be 278 ft. in height. In the Gippsland District of Victoria too, there are eucalypts of abnormal size, but no specimen has yet been found over 300 ft. in height. It may be, of course, that in the article in the magazine already referred to, in which it is stated that one variety of eucalypt found in Victoria reaches a height of 380 ft., this figure is a misprint for 300 ft. Certain it is that no tree in Victoria, or anywhere else in Australia for that matter, has been found of a height of 380 feet.

The jarrah and karri of Western Australia stand in a class by themselves. These timbers—particularly the former—have been exported in large quantities to Europe, Africa and Asia. It is admirably adapted for piling, as is stated in the article already referred to, but such a purpose does not by any means define the range of usefulness of the timber. It can be safely said that there is no purpose in building construction to which jarrah cannot be applied. In bridge, harbour and wharf work it is extensively used, but, in addition to what may be termed rougher purposes, it can be utilized in other and superior ways. As a furniture and decorative timber, jarrah has scarcely any equal. In the Empire Forestry Exhibition held in London last year the display of high-class furniture and panelling in jarrah attracted a great deal of attention. Karri is a close relative to jarrah and it can be put to all the purposes to which jarrah is put, both rough and fine, with the sole exception that it does not possess the durable qualities of jarrah when in the ground.

Why Not Import these Hardwoods?

These two timbers are exported every year to a value close upon one million sterling, and during this year it is probable that the million limit will be again passed, as it was on one occasion before the war. One of the anomalies in inter-Dominion trading centres round Canadian softwoods and Australian hardwoods. The Commonwealth is a large importer of Canadian timber. The Australian knows the value of the Canadian product and he uses it for a great many purposes. But information does not seem to have reached Canada about the qualities of Australian hardwoods, or, if it has done so, it has been confined to a comparatively limited

HOW COTTONWOOD GROWS.

A specimen at Senneville, Quebec, that measures 16 feet 2 inches in circumference. Photo by J. N. Stephenson.

circle. And yet Canada uses a fairly large quantity of hardwood every year, and it is certain that, if the Australian product were better known, it would receive a general acceptance, and the moneys now sent from Canada to foreign countries for hardwoods would be kept within the Empire.

THE FOREST SCHOOL OF THE UNIVERSITY OF WASHINGTON, SEATTLE.

This unique structure, so admirably suited to the nature of the school, readily attracts attention by its massive pillars of solid logs. The success of this institution especially in the teaching of logging engineering has gained for it a wide reputation.

A FOREST FIRE PHENOMENON.

The District Forester at Nelson, B.C. reports the following phenomenon in fighting fires in his district:

"We had a 400 acre slash fire the last week in May near Arrow Park. Heavy rains in June apparently obliterated all trace of fire but we kept a couple of patrolmen on to dispose of stubs. Something over 100 of these, many 4 feet on the stump, have been felled and the most remarkable feature is this—each of these punky hemlocks has one to two bucketsful of clinkers, red hot, which have formed within the green shell. They show no smoke but by careful observation heat waves may be detected. Periodically there is an explosion of confined gases and these hed hot clinkers are propelled in all directions like the fragments of a bursting shell. Naturally they started up many ground fires until felled and extinguished. I may add the original fire ignited these trees any way up to 80 or 90 feet, burning the top off and then proceeding to work down inside the trunk. I am today forwarding a preliminary fire report on a fire which we have every reason to believe was held over in punky hemlock from last year, and we have an authentic case of hemlock smouldering all winter in the Edgewood Lumber Company camp at Arrow Park. Sceptics may see, at this office, samples of the clinkers mentioned above."

The Museum of the Forest School, University of Washington, Seattle.

TREES TO CUT FOR IMPROVING WOODS.

Trees which are well suited for firewood, and the removal of which will be an improvement for the remaining trees in the stand.

Trees which have been overtopped by others and have had their growth stunted.

Diseased trees,, or trees seriously injured by insect attacks, or trees extremely liable to such injury; for example, chestnut in the region subject to blight or birch in the gipsy-moth area.

Badly fire-scarred trees.

Trees of the less valuable species.

Crooked trees and large-crowned, short-boled trees which will not make good lumber and which are crowding or overtopping others.

Slow-growing trees crowding fast-growing species of equal value.

Sound dead trees, both standing and down.

PROTECT WOODS FROM FIRE.

A tree will make a million matches—a match may destroy a million trees.

Take no changes with lighted matches, tobacco, brush or camp fires.

Forest destruction is quick—forest growth slow.

Burned timber pays no wages.

When fire is discovered, put it out if you can. Get help if you need it.

An APPRECIATIVE WORD.

From Manly H. Craig, Deputy Land Surveyor, Perth, N.B.: "I have just received the August number of the Canadian Forestry Magaine and to me is a very marked improvement over the former issues. I want to assure you that this one copy is worth to me a full year's subscription and membership and would not part with it for $2 if I could not get another."

VALUED APPROVAL.

From Colonel Henry S. Graves, Washington, D.C., lately Chief Forester of the United States:

Canadian Forestry Assoc.:

"I enclose my subscription for 1921. I ish to express my appreciation of the excellent work which is being done by your organization. Foresters on this side of the border are watching your work with a great deal of interest and one hears many times expressions of commendation of what you are doing."

A New Method of Cutting Christmas Trees

(*From the Journal of Forestry.*)

I was very much interested in the article that appeared in the Journal for March under the title "Christmas Trees Cut Without Destroying the Parent Tree." It happens that there is a student in one of my classes who has cut Christmas trees on a plantation for several years past. The plantation is situated in Monroe County, Pa., and consists of spruce and balsam fir. I am informed that the method of cutting these trees is invariably to leave one branch of the lowest whorl of branches so that the stand may continue to be productive almost without interruption. During the past 20 years as many as seven trees have been taken from some of the stumps. In fact, the rule is never to cut the trees below the lowest whorl unless a thinning is necessary.

LAWRENCE SMITH,
Instructor in Forestry.

Department of Forestry,
State College, Penna.

Germany's Paper-using Customs

Former Postmaster General, A. S. Burleson, who has been in Germany investigating the possibilities of marketing American cotton, reports that Central Europe has become so accustomed to using paper substitutes for many textile articles that the task of getting back the market there for American cotton is an extremely difficult one while the German mark remains at its low and widely fluctuating value. White paper table cloths and napkins have been in general use for nearly five years, and even the best hotels in Berlin no longer feel it necessary to provide linen or cotton cloths for their tables. Great rolls of heavy crinkled paper are kept in all restaurants and hotels. Waiters cut table lengths from these as required. The same system is resorted to in private houses. Germany has an abundance of paper and the price is low. Woven paper cloth has replaced cotton, woolen and silk fabrics almost entirely as upholstering and drapery material in car furnishings. Woven paper towels and tablecloths have been perfected which can even be washed two or three times.

Remarkable Success in Tree Planting

By N. J. Anderson, of Barnwell, Alta.

It was after Mr. Anderson had failed in his attempt to prepare a "dust blanket" over his land, in order to preserve moisture for the growing of crops in the dry farming district of Southern Alberta, that he conceived the idea of planting trees. We give the interesting story in his own words.

I always believe in profiting by the experience of others, and if there is anything new comes out in methods of agriculture, I am usually one of the first to try it for better or for worse.

While on a trip to the Lethbridge Experimental Farm, the idea came to me to plant trees. I set to work and plowed three strips, each one rod wide, and arranged these strips 40 rods apart through my 160 acres, dividing my homestead into 40 acre plots running north and south. These I ploughed about twelve inches deep and thoroughly cultivated all summer, taking care to keep all the weeds down. My grain was re-sown, and made a fine growth, but was thrown late and injured by frost in the fall.

Having plowed and prepared these strips to plant trees the following year, I applied to Mr. Norman M. Ross, of the Dominion Forestry Nursery at Indian Head, Sask., for five thousand trees. My large order attracted the interest of the tree inspector, and he came to my home to inspect the tree plots. I well remember his objecting to my plans, saying the plots were not wide enough to be self-supporting in the future, as a windbreak must consist of several rows in a plantation form to be successful, in order that they might hold enough snow in winter to pull them through the summer when they were too large to cultivate. But when I explained to him that I intended to plant only three rows, four feet apart, in each strip, and the trees four feet apart in a row, and promised to cultivate and keep them clean for a few years, after which I was sure we should have irrigation developed here to keep them going, the inspector then said that as I was so keen he would consent to furnish the trees free the following spring. He suggested my planting Russian poplar in the centre row, every other tree maple and ash in the east rows, and willow in all the west rows of each strip, the rows to be four feet apart. He took a drawing of my plans, and the trees were furnished the following spring.

I followed the instructions given me in putting in the trees. The maple and ash were furnished as seedlings, while the Russian poplar and willow were cuttings. I put the cuttings in with a shovel at an angle of 45 degrees, allowing only one bud to be exposed, and packed the soil well on top of each cutting. The seedlings were laid at the same angle in a plowed furrow, and covered also by the plow at least three or four inches deeper than they were in the original nursery. I packed them by running a wagon wheel up and down the rows just over the roots of the seedlings, taking care not to run over the tops. It took two of us only four days to complete the job. I don't believe over 25 trees out of the five thousand died, and the secret is to properly prepare the ground a year previous to planting, and then to plant properly and, above all, pack well, after planting. The first season's growth was from 3½ to 4 feet, and looked a perfect picture. The inspector called at this time, and was more than pleased. He found them perfectly free from weeds and well cultivated, which he said was the whole secret. I have two children who have

Mr. Archibald Mitchell, in charge of the Canadian Forestry Association's tree planting campaigns on the prairies is here shown giving a demonstration in correct methods of tree pruning.

spent an hour each day of the summer holidays hoeing these trees where it was impossible to reach with a cultivator, and that has been sufficient to keep the whole five thousand trees clean, and has also encouraged a home-making interest in the children.

The trees are now an average of ten to twelve feet high, and the coming year will for the first time see a stream of water running beside each windbreak, as we now have irrigation. I intend to use these rows in the future not only for windbreaks for the land, but for shade for cattle, when I will use two of these 40 acre plots for pastures. I will irrigate the one while pasturing the other; then change about. Hay and grain will be raised in the other two plots.

Around my residence I have planted Norway poplar, cottonwood and laurel willow; also caragana for hedges. I have evergreens growing in the shelter of the above-mentioned trees. Beside my home and at the back I have two separate enclosures of an acre each, with six rows of trees around the outside, making an ideal place for garden and small fruits. I have nothing original to tell you, only I was willing to try what others said could be done, and I declare that there is no spot in Canada too dry to grow trees, for I have tried it, and in 1918 and 1919, when we had insufficient rainfall to raise crops of grain, my trees grew from three to four feet each year, and practically every tree is alive, and pulled through two of the driest years I have seen since Albert was settled. In 1919, when even the grass never became green as a result of drought, my whole farm looked like an oasis in a desert, and my trees were really the only thing that was green on my home, and were a great comfort to us all.

It is wonderful to think that only four years ago a mere bud of a cutting projected an inch out of the ground and seedlings possibly 18 inches. Many of my neighbours predicted failure in my attempt, but year after year the trees grew taller as their predictions grew smaller, and now I am supplying these same people with cuttings, while they could just as well have had trees twelve feet high, doing away with the barrenness of the prairie, breaking the wind, creating joy in home-making, and showing that our lives and surroundings are just what we choose to make them.

COMPANIES EAGER FOR FORESTERS

MILFORD, Pa.—"That forestry has advanced in the last fifteen years from a mission to a recognized profession is in no way better evidenced than by the manner in which the paper industry has provided positions in its organizations for the technical forester," said O. M. Porter, Assistant Secretary of the American Paper and Pulp Association, himself a Yale forester, to the students at the Yale summer school at Milford, Pa., at their camp fire tonight.

"There are now so many foresters engaged professionally by paper companies that there is a special department, the Woodlands Section, in the American Paper and Pulp Association, composed of foresters and woods superintendents of paper companies and the Executive Secretary of the Association itself, Dr. Hugh P. Baker, is a Yale Forest School alumus.

"These foresters are carrying into this great industry, both in the United States and Canada, their profession by practicing it, and I am proud to say that they are recognized as delivering the goods so effectively that their methods, once regarded by practical woodsmen as fanciful theories, are now recogniezd as making a profit for their employers.

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It will snake logs when teams are out of the question.

The JT will turn in a radius of 6 ft., its width over all is 60 inches, and it has a caterpillar traction of 1,628 sq. inches.

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NORTH BAY, MONCTON.

Russian Poplar on the Prairies

By Archibald Mitchell.

Well worth the trouble of planting, but this prairie farmer has not made a complete success of his work. Cattle have been allowed to browse about the shelter belt of Russian poplar with evil results, the wind protection near the ground being seriously decreased. Also the belt was not planted thick enough in the first place.

In some parts of Saskatchewan, notably around Saskatoon and along the Goose Lake Line to Zealandia and beyond, among the older plantations the farmers are approaching another stage in farm forestry.

Many of the old plantations consist of Russian Poplar about 16 years old and 30 feet high.

They have usually been planted with the rows 6 to 8 feet apart, and the trees 4 feet apart in the row.

The lowest branches of practically all of the trees are dead and dropping off, and there are also many dead branches higher up, even the tops of some of them being dead.

The dying of the lower branches is caused by the light being shut off from them through the dense foliage of the tree tops, and is a natural condition seen in all close grown forests.

It is different with the dead upper branches for they are an indication that all is not well with the health of the plantation. Many of the trees have canker spots on them showing large blisters of dead bark, which increase in size from year to year. This is an indication of disease and such trees will in time die.

The number of diseased trees is increasing, and soon instead of fine dark green vigorous looking plantations round the farm premises, refreshing to the eye and indicative of progress, we shall see only a lot of broken skeletons of tree groves, and another failure will be registered in the history of tree growing.

Underneath these trees, the ground is often covered with weeds, the worst and most persistent being perennial bluejoint grass. The ground is hard and dry, sometimes trampled by stock, and just about everything a forest floor should not be.

This is the general condition of these groves and while it is not pleasant to contemplate the result of our planting twenty years ago becoming a wreck, still from what we know of the Russian Poplar, it is only what we can expect.

There is really no reason to be alarmed, only we have to realize that the first stage of these plantations is over and it is now time to attend to the second.

The Russian Poplar is, at best, but a short lived tree as trees go. We know some of them will live thirty years, but we also know many will not live twenty. That is about all we know about them. They have not been tried out much more than thirty years in the west. Meantime, these Russian Poplars around Saskatoon and down the Goose Lake line, have served their purpose. If more planting of this kind had been done the country would have been stimulated to a much greater degree than it has been all over the country.

What is required now is first to kill the perennial grass underneath the trees, and restore the condition of the soil.

The grass is killed by covering the ground with about a foot of straw in the month of June, when it is in the vigor of its growth.

Note:—The month of June or early in July is the only time of year this can be done successfully.

The lower branches may be pruned 4 or 5 feet up for this purpose if necessary.

Two years or so after, when the grass is all choked out and the straw mulch has become well rotted, the ground below the trees will be found to be moist and mellow, different altogether to what it was before the mulch was applied.

It is now ready for the next stage in the life of the plantation, underplanting with Spruce. Small plants about a foot high should be used and they should be planted 4 to 6 feet apart in holes under the trees. They will not need any cultivation, the rotted straw mulch and the shade of the older trees will preserve plenty of moisture for them. Spruce is besides, a lover of shade in its younger stages and it will rapidly become established. In about 5 or 6 years, when the trees are four or five feet high, the Russian Poplar can be gradually cut out from over them, leaving in time a pure plantation of spruce. This is the way these plantations should be managed.

Jellied Salad
à la Bovril

Take cold sliced potatoes, tomatoes, a few pieces of onion cut very small, asparagus tips, cauliflower heads, or other suitable cold vegetables. Place in moulds and cover with hot Bovril in which has been dissolved powdered gelatine in the proportion of a heaped teaspoonful to a pint. Chill and turn out on fresh crisp lettuce leaves. Serve one mould to each person.

This dainty and unusual dish is not only light; because it is made with Bovril it is *nourishing.* Bovril contains the goodness of the beef. Use it in all your cooking.

Close Planting for Trees

By Archibald Mitchell.

A constant subject of discussion among western tree planters is the closeness of planting.

"Don't you think the Forestry Branch trees are too closely planted?"

"Why? What makes you think so?"

"Well, in three or four years they are so close you can't cultivate them any more."

"What do you want to cultivate them for?"

"Well, to keep in the moisture, is'nt it?"

"That's right, it's to preserve the moisture for the use of the trees. And why do we have to preserve it."

"Because we don't get enough."

"For trees? Oh no, that's not quite it, for we do get enough every year for trees, even in the driest years. If we did not, all the trees planted on the prairie during the past twenty years would have died in the last three or four years, would'nt they? But they have not. There are thousands of them living and flourishing too, many of them making several feet even in such a dry season as last year.

"We cultivate our trees for something else, not because we don't get enough rain for them, but because we want to keep what we do get. That's what we cultivate for, to keep the moisture.

"And when we talk about keeping the moisture, that naturally brings up the question of "How do we lose it?", doesn't it?

"And how is it we do lose it?"

"We lose it mostly through the action of the sun and the wind, and this brings us back again to the original question about the close planting. We plant the trees close, 4 x 4 ft. apart or 4 x 6 ft., so that their branches will meet as soon as possible and shade the ground from the sun, and shelter it from the wind.

"This is the way nature does, as may be seen any time on examining a bluff of native trees. There you will find close planting and dense foliage shade to perfection."

"Add to close planting, the free use of shady trees, and the planting of broad belts from 60 to 700 ft. wide, and you have the whole secret of success in farm planting.

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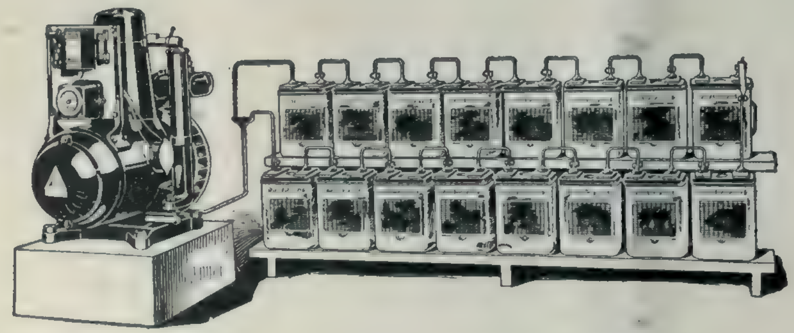

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The plant illustrated above is identical with that used on the 1921 Tour of the Canadian Forestry Association's Eastern Exhibit Car.

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LANDS CONTRACT BY AEROPLANE.

When J. D'Ersby, of the D'Ersby-Dewar Co., contractors, Vancouver, B.C., arrived at his office one morning he found that he had until noon to submit certain figures to a local concern to be in the running for a big building contract. These figures, or many of them, were in the hands of his partner, who was in Mons, sixty-eight miles north of Squamish—and no telephonic communication.

There was only one possible chance of getting the required information, and Mr. D'Ersby took it. He phoned Major Earl Godfrey, manager of "Aircraft Manufacturing, Limited," and arranged to have one of that company's aeroplanes take him to Mons. Mr. D'Ersby arrived there in record time, located his partner, and returned to Vancouver at 11.50 a.m. He got the contract.

FALL BURNING OF BRUSH.

Request Issued by New Brunswick Forest Service.

"The Department is anxious that you should do all you can to encourage fall burning of brush instead of spring burning. This would eliminate much of our spring fire trouble and also the person clearing land would be able to work the land earlier in the spring instead of waiting until the brush, etc. was dry enough to burn, when usually the surrounding country is also dry and dangerous. Anything you can do along this line will be appreciated."

A TIE SUPPLY FOR THE NATIONAL ROADS.

Jack-pine ties predominate in the quantities of ties used in Ontario, Quebec and the Prairie Provinces to-day. Hemlock comes second, and in certain sections where it is cheaper and more available timber it exceeds the quantity of jack-pine used. Hardwoods follow third in quantity, and are increasing in favôr in Southern Ontario and Quebec, particularly on Grand Trunk lines.

Where jack-pine timber is available it is frequently cheaper, as the hewing is more easily performed, and the tall, straight tree more adapted to getting out ties in quantity, but the supply of jack-pine tie timber is more limited than the operators themselves often imagine. Timber cruisers who are thoroughly familiar with the tie supply situation between the East and the Rockies are seriously wondering if the supply will last twenty years. This shows the imperative need of preservative treatment, and the wisdom of C.P.R. in erecting the Sudbury plant. The national lines are said to have considered the erection of a plant of the same capacity.

The yearly tie requirements of the C. P.R. are understood to be around six million—the C.N.R. the same, but with the addition of the Grand Trunk with the national lines, the national tie requirements will probably be around ten milmillion.

Jack-pine a few years ago was not in demand for lumber purposes, but to-day it is being sought extensively and throughout Northern Ontario in particular. Pulp companies, especially kraft mills are using it—the news print mills utilizing a larger quantity yearly.

It is not improbable that many new uses will result in jack-pine for ties not being available in quantity in a few years. The life of an untreated tie being six years, and a creosoted tie almost three times that length, it seems as it the responsible authorities should urge preservative treatment before their installation in the tracks.

SAVING TIMBER BY CREOSOTE.

(*From the Financial Post.*)

SUDBURY.—With the shipment of a train-load of creosoted ties this week, another Ontario industry, The Canadian Creosoting Plant, has taken its first step towards meeting the heavy demand of Canada's Railways for ties, fifteen million of which are yearly required. The new plant is located on the road between Copper Cliff and Sudbury, and it is the intention of the company to first take care of the immediate demands of the C.P.R. for ties, before accepting work from other roads or handling timber, other than ties.

Creosoted timber and ties are one move in the direction of the conservation of timber resources and for building purposes, and the treatment also places timber in a position to stave off the inroads concrete and steel were making. Creosote extends the life of timber some 7 or 8 years in ties, and 300 to 00 per cent in buildings, and so in a measure, makes up for the constantly increasing cost of timber production.

It is only in the last few years that creosoting has been adopted in Canada. Heavy inroads on our timber, especially the most desirably located limits, has yearly added to the cost, and so to-day, the creosoting system in vogue in France for 30 years, and in the U.S. since 1885, is being universally adopted. Of course the rapid extension of Canada's steam roads, and different radial systems, has had much to do with increasing the tie demand. As an evidence of this, it is noted that the C.P.R. is calling for tenders for the delivery of a million ties for use

Thousands of railway track ties stacked in the yards of the Canada Creosoting Company, Trenton, Ont., awaiting the creosoting process that will almost double their endurance.

A great many acres of this timber have been "drowned' by the sand dunes of Prince Edward County, Ontario. The white light through the trees is not the sky but a thirty-foot wall of sand which will soon reach the woods.

on the central lines in Ontario and Quebec, for 1922.

The new Sudbury plant is expected to treat over a million and a half ties yearly and at a later date will start the treatment of bridge and other timber. At present 10 to 15 thousand ties are treated daily, and there is a stack of over half a million ties in the yards, to work on, with train loads coming in daily.

RAPID GROWTH OF TIMBER FOR PAPER.

An intensive survey of Canadian timber lands, by Edward F. McCarthy, one of America's best known foresters and forest investigators, has shown that surprising crops can be secured from cut over pulp wood land by proper handling.

An address before American foresters, attending the annual convention of the Woodlands Section of the American Paper and Pulp Association, told of his investigations on a 19,000 acre tract of timber land. He showed that there is a startingly rapid growth of new timber on cut over pulp wood lands of mixed hard and soft woods, when protected from fire.

Mr. McCarthy was the first forester on the faculty of the New York State to make a series of investigations of Canadian forests for the Canadian Commission of Conservation.

Mr. McCarthy's investigations showed that ten years after an original cut of 2.9 cords per acre on virgin mixed timber in the Canadian region, there was a stand of 4 cords, and at the rate of growth maintained in the last ten years, in another ten there will be 6¼ cords per acre, and 7.6 cords in 15 years. His investigaions, however, showed a serious mortality due largely to insects.

WOOD SHINGLES FROM BRITISH COLUMBIA.

(American Forestry)

Last year fifty thousand homes and buildings in the United States were roofed with cedar shingles which came all the way from British Columbia. We now rely on this well timbered Canadian province for one-seventh of all the wood shingles used in this country. It is indeed well for us that we have this outside source of supply, for it is estimated that the combined red cedar resources of our greatest shingle producing states, Washington and Oregon, amount to less than forty billion feet, which, if it were forced to fill all our shingle needs, would be entirely exhausted in less than eight years. The use of other woods, such as redwood, cypress, white cedar, pine and hemlock serves to reduce this drain on the red cedar supply, but unquestionably red cedar now stands preeminent among all shingle woods.

The Canadian Government has estimated that there is over seventy billion feet of good shingle cedar in the Province of British Columbia, nearly twice that remaining in our northwestern states. Until reforestation can begin to compensate for our own consumption we will grow each year more dependent upon British Columbia for shingles, or we must be prepared to pay much higher prices than ever before.

The proposal that shingles be made one of the articles to receive a high tariff will, if adopted, place squarely before everyone the present and immediate need of taking steps to conserve our forests. It will be a bitter pill to swallow, but one that should prove effective.

Canadian National Railways

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Forest Products. The forest resources of Canada are served, in the main, by the Canadian National Railways. The pulp and paper mills, with few exceptions, are situated on its lines.

Minerals. Practical information on the mineral resources of Canada, and opportunities for development.

Intelligence Service. The Industrial and Resources Department of the Canadian National Railways has the widest range of information on Canada, and which is available to the public.

Correspondence is invited from manufacturers, mining men, trade representatives, chemical engineers and others desiring information on Canadian conditions, resources, and industrial opportunities.

R. C. W. LETT, General Agent,
EDMONTON, ALTA.

J. WARDROP, General Agent,
WINNIPEG, MAN.

C. PRICE GREEN.
Commissioner.
Industrial and Resources Dept.
TORONTO

The National Way

WHAT THESE FIRES MEAN!

Forest fires in the United States annually destroy more than 2 billion feet of timber, or material enough to build a 5-room frame house every 100 feet on both sides of a road extending from New York to Chicago, according to the Forest Service, United States Department of Agriculture. With four people to a house, these 100,000 or more buildings would provide a home for nearly one-fourth our yearly increase in population—a number sufficient to populate a new city each year the size of Cincinnati, New Orleans, Minneapolis, Kansas City, Mo., or Seattle.

FORESTRY CAR AT FREDERICTON.

Sixteen Hundred Children from Fredericton's public schools attended the lectures and moving pictures in connection with the Canadian Forestry Association's visit. It was necessary to hold two meetings to accommodate all the school children, while a third meeting was held to accommodate the Provincial Normal School students and the public. Moving pictures of fire fighting provided by the Canadian Forestry Association, with fishing and hunting scenes on Cains River and Salmon Lake, N.B., provided by Harry Allen, President of the N.B. Guides' Association, were appreciated by old and young; many of the children had never seen a live moose. Lectures on fire prevention were given by Col. T. G. Loggie, Deputy Minister of Lands and Mines, His Lordship Bishop Richardson, Dr. C. C. Jones, of U.N.B., Dr. B. C. Foster, Principal of the High School, and Dr. H. V. Bridges, principal of the Provincial Normal School, and R. D. Hanson, Secretary of School Trustees. Through the active co-operation of the N.B. Forest Service, the city school board and Harry Allen, of the Guides' Association, the meetings were most successfully arranged and conducted.

THE VOICE OF PATRIOTISM.

From Jos. A. Wright, Winnipeg: "Please find closed order for five dollars. I take great pleasure in accepting a contributing membership in this far-reaching cause. I have been over burnt tracts of forest and unless one has been it is hard to realize the awful destruction of one of our greatest assets? Wishing this great association the greatest success."

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REVENUE FROM FORESTS OF INDIA.

The Inspector General of Forests has furnished the following official statement of revenues, for the period 1909 to 1918:

	1909-10	1910-11	1911-12	1912-13	1913-14
Gross Revenue	$8,675,265	$9,135,151	$9,685,786	$10,403,266	$11,100,515
Expenditure	4,976,885	5,081,341	5,648,855	5,769,270	5,847,818
Net Revenue	3,701,713	4,053,810	4,036,931	5,000,666	5,252,663
Total area in square miles	224,551	243,478	242,960	238,923	245,612
Area under forest W. plans	49,421	50,183	50,892	51,722	53,926
	1914-15	**1915-16**	**1916-17**	**1917-18**	**1918-19**
Gross revenue	$9,903,261	$10,372,122	$12,353,977	$13,656,419	$15,606,077
Expenditure	6,068,817	6,197,538	6,247,961	7,052,354	9,625,168
Net revenue	3,834,445	4,174,587	6,106,008	6,604,064	5,980,908
Total area in square miles	249,867	249,000	246,579	251,512	251,468
Area under forest W. plans	55,629	57,444	58,588	60,724	60,670

The total acreage for 1918-19 is about 161,000,000 acres.

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ALL GRADUATES EMPLOYED.

The Faculty of Forestry of the University of Toronto had in attendance during the last session 55 students, a total slightly above that of the session 1914-15, when war broke out and the ranks were consequently reduced during the following years. Of this number one of the students was for occasional work only and one for special work. There were six students in the Senior year, on all of whom the degree of B.Sc.F. was conferred at the Convocation held in June. Two of these have secured permanent positions with the Dominion Government, 15 in the Forestry Branch and one in the Entomological Branch, 16 by the Ontario Forestry Branch, and 11 by private pulp and paper and lumber companies.

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FOREST RANGING IN FAR NORTH.

(Cochrane Post.)

Mr. A. E. Trowse, Deputy Chief Ranger, in charge of the works along the rivers north of the C.N.R. returned last week from a trip through the mouth of the Moose river. He went down the Massanabie in three days to Moose Factory, and made the return trip via the Mattagami and Kapuskasing, taking seven days for the return trip. The rangers which are patrolling the rivers north are at the same time cleaning up the different portages, making them safe for campers, and good work has already been done this season. Only in one instance had a camp fire got away, but luckily was checked in time to prevent it from running into the green timber. Mr. Trowse confirms the fine stand of timber to the north, right up to the James Bay, and reports that the Hudson Bay Co., who have two sawmills in operation, are cutting this year some 300,000 feet of lumber. The big boom at the bay contains some fine big logs, he claims. Moose Factory is quite a town, he thinks, with good substantial buildings, and it was rather a surprise to see the Indians there having a football team. Quite a large number of the Indians around there are returned men, as the Moose country furnished the bulk of the Indians for enlistment during the war.

FROM R. C. HENDERS, M.P.

"I wish to express my approval of the work your Association is attempting to carry on and to assure you that you can count on me for co-operating to the fullest extent."

According to current reports the Canadian lines are postponing erection of a creosoting plant because they do not now own a sufficient supply of timber to warrant the expenditure. The Province of Ontario, however, may see its way to get over this difficulty which at present embarrasses the future of the National railways.

A SPECIAL BARGAIN IN THE OUTDOORSMAN'S HANDBOOK.

320 pages, well illustrated, cloth covers. Chapters on camp and trail, camp cookery, woodcraft, big game hunting, rifles and pistols, bass and musky fishing, trout fishing, and a host of outdoors subjects. Every chapter by an authority. The Canadian Forestry Magazine secured a small number of copies for readers. Only thirty left, to be sold at cost, $1.25 each. Add ten cents for packing and postage. 224 Jackson Building, Ottawa.

DO YOU KNOW THESE FACTS ABOUT THE ASSOCIATION?

Not unnaturally, some who have belonged to the Canadian Forestry Association a short time, confuse the character and purposes of the Association with those of the Government Forestry branches. Sometimes we find that members regard the Association as a body of timber owners. In both cases the understanding is erroneous and unless corrected is apt to weaken the individual member's interest in the Association.

The Canadian Forestry Association is an educational league of 12,000 Canadian citizens, four thousand of whom live in the prairie provinces. A thousand live in Toronto and 1,100 in the city of Winnipeg. The members are not an appendage, but constitute the body and brain through which the Association does its educational work. Each member receives the Illustrated Canadian Forestry Magazine, but more important than being a reader of our magazine he is a personal shareholder and exerts a personal control over the widespread educational enterprises in forest fire prevention and tree planting, frim which Canada derives a mighty benefit.

The Association has no relation to the work of fire ranging or tree distribution or tree planting, all of which are the duties of Governments or limit holders organizations. The Canadian Forestry Association is purely educative. Its work is spade work. Its duty is not to fight forest fires but to prevent such fires from ever being started. Its zone of action is not in planting a few thousand trees but in persuading a few thousand men each year to plant a few million trees.

The Association is a chain of 12,000 links. Its work is wholly for the good of Canada. It is citizens' work. It cannot be shoved off on the back of "Let-the-government-do-it."

The great thing is to keep your membership in fighting trim. If your membership and subscription stand unpaid, your personal share in the Association's great enterprises is largely nullified.

Canadian Forestry Association, Ottawa, Canada.

Did you like the August issue of the new Illustrated Canadian Forestry Magazine. Many members are writing in that "it is a big improvement." Plenty of good things await you in the next four issues.

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Using substitute woods in construction,
Treating non-lasting woods.

4. Increasing crop yields by planting forest tree windbreaks.

5. Growing more and better timber on the farm through

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THE PRACTICAL WAY OF INSURING THE NATION'S TIMBER.

Here are a few extracts from the daily diary of forest protection meetings held in connection with the Forest Exhibits Car of the Canadian Forestry Association in Northern Ontario and Quebec:

La Reine, P.Q.—"I procured the schoolroom here and moved batteries and motion picture machines across. The hall was packed and overflowing. The parish priest gave a fine speech and our Mr. Lemay followed with usual forcefulness. About 300 people were turned from the doors for lack of accommodation.

La Sarre, P.Q.—Crowd was so large that we had to take equipment out of doors. About 600 persons all told.

Makamik, P.Q.—300 persons visited car in afternoon; 1,200 were at the evening meeting and great enthusiasm shown.

Cachrane, Ont.—Train late in arriving, but we had 500 persons for an open air meeting, including Mayor, President of Board of Trade, etc.

Moonbeam, Ont.—We decided to try the basement of the church which seats 250. The hall was packed that night, and it would have done your heart good to hear the cheering when the movies were being shown.

Timmins, Ont.—Two thousand people visited us here, our largest audience in the north country.

Montieth, Ont.—Fully eighteen hundred people went through the Exhibit Car, several of them Ontario cabinet ministers.

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THE FOREST AND THE PRESS.

(From Forest Leaves, Pensylvania.)

The relationship between the forest and the press is one of the most vital economic problems of today. This is truly a paper age, and even more truly a newspaper age, which is the same as saying that it is an age of wood.

To most readers a newspaper is a thing to be hastily scanned. Few men who run while they read stop to think what a close co-ordination of service from the lumber-jack to newsboy is needed to produce a 2-cent and up-to-the-minute resume of the world's happenings in society, politics, industry, science and education. Still less do they realize that the newspaper which he holds in his hand is the only constituent of newspaper print. This is why the forest problem touches so intimately every man, woman and child in the United States.

After all is said and done, the newsprint situation goes straight back to the woodpile; and the size of the available woodpile is now and will hereafter be the determining factor in the paper supply.

Few people know how large a pile of wood is used annually in the United States for the production of paper. Our annual consumption is now over 6,000,000 cords. If stacked upon an acre this number of cords would make a solid pile four miles high. Government experts estimate that the consumption of pulpwood in the United Staes will reach 10,500,000 cords by 1930 and 16,000,000 cords by 1950.

I know of no way by which the real economic significance of the forest situation may be understood more clearly than by considering briefly the history and present condition of the paper, particularly the newsprint situation.

Before 1850 cotton and linen rags, esparto grass, hemp, straw and other vegetable fibres were used in the manufacture of paper. It was not until 1840 that Keller patented his process in Germany for a wood-pulp grinding machine. The process was not placed on a commercial basis until 1854, and it was introduced into the United States by Warner Miller as late as 1866.

The growth of the paper industry in America was prodigious. Within a half century it has developed from practically nothing to a total consumption of 2,000,000 cords in 1900, and in 1920 the total consumption exceeded 6,000,000 cords—an increase of 200 per cent in less than two decades. In 1880 the average person in the United States used about 30 pounds of paper per year. Today the average person uses 147 pounds per year.

We all know that the demand for newsprint has been increasing by leaps and bounds. In 1899 there were consumed 569,000 tons, while in 1918 our consumption had risen to 1,760,000 tons—an increase of about 200 per cent. In 1880 the average amount of newsprint consumed by each person in he United States was 3 pounds, and in 1919 it was 33 pounds—an increase of 11 times in 40 years.

The first newspaper in America was published just 231 years ago. Today there are about 26,000 daily, weekly and semi-weekly newspapers in the country. The daily papers alone have a circulation of more than 28,000,000 copies. There are 60 dailies whose circulation exceeds 100,000 copies and one Sunday paper claims more than a million circulation. This rapid growth shows the increasing demand for pulpwood, and the enormous present drain upon our forest supplies.

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FORESTRY IN CHINA.

Since the establishment of the Shantung Forestry Office, the "Social Report" (Chinese) says, much activity has been shown in the province.

At the request of the Silk Merchants' Association of Chefoo, no fewer than 52,[illegible] trees—both quercus Mongolica and Mulberry—have been transported to the bsiens within the jurisdiction of Kiachow. A small number has been also sent to Chefoo.

For the protection of the Chefoo-Weihsien and Tehchow-Linz motor roads, the Tsingchow Forestry Bureau has bought 30,000 trees for planting on the highway borders.

The Tsinan Forestry Bureau, too, reports progress. In the Spring of 1920 more than 1,000,000 trees of all kinds were planted and 2,000 oaks were the record of the autumn activity. This year 1,500,000 shoots of pine have already been purchased and are being planted every day.

An exchange for Forestry shoots was started last year, and 40,000 seeds have been circulated throughout the province.

The Forestry Office is undertaking the publication of books on the subject. The first, "Shantung Forestry Questions" is already in circulation.

WHAT THE PRAIRIE PROVINCES HOLD IN TIMBER.

It seems a contradiction in terms to speak of timber or lumber in a country known to the Eastern Canadian as the bald prairies. The "prairie provinces," however are mineralized provinces, and timbered provinces over more of their total area than will ever come under action of the farmer's plow. Only the southern areas of Manitoba and Saskatchewan and Alberta, with such exceptions as in sections of Northern Alberta, can strictly be called prairie.

Five Hundred Million Acres.

It has been estimated that there are about 500,000,000 acres of forest lands in Canada about halt of which is covered with merchantable timber, and the value of the forest products in 1918 was $279,548,011. The prairie provinces contain about eight million acres of commercial timber lands, 5,400,000 acres of which are in Alberta, 1,920,000 acres in Manitoba, and 750,000 acres in Saskatchewan. In addition to this, there are large resources of pulpwood upon which no really accurate estimate has ben made.

Manioba is about seventy per cent wooded, and in this province the principal heavily timbered sections have been set aside as government forest reserves located west of the Red River in the southern part of the province. On the upper plateau of this section are spruce, jack pine, and tamarac; in the lower plateau are found poplar and white birch; in the coulees elm, oak, basswood and white pine. The principal trees in order of present importance are white spruce, black spruce, jack pine, tamarac, balsam fir, aspen, cedar, burr oak, paper or white oak, balsam, balm of Gilead, black ash, basswood, Manitoba maple, cotton-wood, red ash, and mountain maple.

Whilst little extensive commercial use has been made of these woods from the lack of exploitation due to conditions already noted, they possess a potential worth commercially of some magnitude, and have already been extensively made use of locally.

Alberta is estimated to contain about twenty-one billion board feet of saw timber, the principal species being spruce, lodgepole pine, Douglas fir, poplar balsam fir, white birch and tamarac. Fires have wrought destructive havoc in the forests of the province much of which have been devastated and on the burnt-over areas the reproduction is mainly lodgepole pine with areas of poplar and birch. Lumbering operations are principally confined to the Rocky Mountains Reserve which contains all the lumber at present merchantable in Alberta. There are nearly eight hundred square miles at present under license on permits issued prior to the establishment of the reserve.

Saskatchewan's Forests.

In Saskatchewan the area actually timbered with merchantable trees is about 750,000 acres, the counry to the northeast being timbered with spruce, tamarac, and jack pine. Prince Albert is the centre of Saskatchewan's lumber industry.

Though the timber trade of the prairie provinces has not as yet made a startling record in Dominion figures, it is provincially of a high value and of great local importance, and the economic history of the great plains would have been very different but for their possession of the northern woods. Whilst little if any of the timber cut ever gets beyond the borders of its native province, there is a local market whose demands are increasing yearly. The prairie provinces are showing a steady expansion perhaps unprecedented in the history of new countries and their cities and towns, and above all their agricultural areas, have need of lumber in ever increasing quantities.

The lumber cut for the year 1918, the latest return available, for the prairie provinces, was, according to the Dominion Bureau of Statistics, 152,270 million feet B.M. valued at $3,836,053. This is divided among the three provinces as follows: Manitoba 54,047 million feet worth $1,240,052; Saskatchewan 75,835 million feet worth $2,122,307; and Alberta 22,388 million feet worth $473,694. The total cut of the three provinces represents nearly three per cent of the cut all over the Dominion.

Administered by Dominion.

In the provinces of Alberta, Saskatchewan and Manitoba, in common with the North West Territories and the Railway Belt in British Columbia, the forests are administered by the Department of the Interior of the Dominion government from whom leases of timber or permits to cut upon forest reserves must be secured. There are thirty-nine forest reserves in Western Canada, twenty-six of which, with an aggregate area of nearly 32,500 square miles, are situated in the three prairie provinces.

Little has yet been noted of the pulpwood resources of these provinces, an important item at the present time in view of the heavy call being made upon the forests of the east and the commencement made upon those of British Columbia on the Pacific coast. Roughly it may be stated that the prairie provinces have substantial resources of the raw material.

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WHY FARM FORESTRY PAYS.

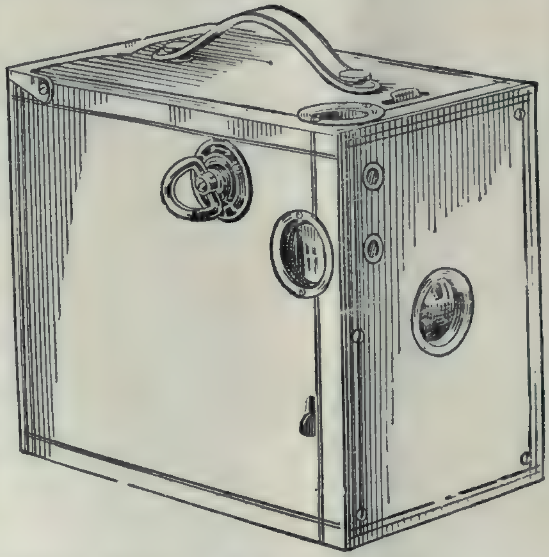
The right handling of forest trees on the farm will make it more prosperous, add to its comforts as a home, and enhance its value as an investment.

The home forest, in many sections of the country, will supply the timber which the farm needs for buildings, fences, fuel, repairs of all kinds, and many other uses; and there will often be a surplus which can be sold in the form of standing timber, saw logs, posts, poles, crossties, pulpwood, fuelwood, and blocks or billets for making spokes, handles, spools, boxes, barrels and excelsior.

A well-cared-for home forest serves also as a wind-break for buildings, a shelter for live stock, a protection of valuable lands from erosion, a means of profitable employment for men and teams during otherwise spare or idle time, a place of recreation, and an improvement in the appearance of the farm.

Trees improve and build up the soil. The leaves, small twigs, and other tree litter decompose and form a layer of dark-colored vegetation mold, which enriches the soil and stores up soil moisture. By means of this layer of mold, the binding of the soil by the roots of the trees, and the resistance of the trunks to the rapid flow of water, the woods prevent floods from gullying or destroying the land by erosion, particularly on steep slopes.

Even if a farmer sells no timber the woodland pays. The firewood, fence posts, and material for repair and construction on the farm, the time and money saved by having them conveniently on hand, and the protection against extremes of weather afforded the crops, farm buildings, and stock are worth considerably more than the slight trouble and expense of raising an dcaring for the trees.



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TEN HELPS IN MARKETING WOODLANDS PRODUCTS.

1. Get prices for various wood products from as many saw mills and other wood-using plants as possible.

2. Before selling, consiult neighbors who have sold timber and benefit from their experiences.

3. Investigate local timber requirements and prices. Your products may be worth more locally because transportation is saved.

4. Advertise in papers and otherwise secure outside competition.

5. Secure bids if practicable both by the lump and by log-scale measure.

6. Be sure that you are selling to responsible purchasers.

7. Get a reliable estimate of the amount and value of the material before selling.

8. Market the higher grades of timber and use the cheaper for farm purposes.

9. Remember that standing timber can wait over a period of low prices without rapid deterioration.

10. Use a written agreement in selling timber, especially if cutting is done by purchaser.

HELP PREVENT WOODS FIRES.

BE SURE your match is out before throwing it away.

DON t throw away burning tobacco.

CHOOSE a safe place and make your camp fire small.

PUT OUT your fire wih water and then cover it with earth.

DON'T make large brush heaps. Choos ea still day for burning, and plow furrows to protect nearby woods.

BE CAREFU LWITH FIRE.

NEW BRUNSWICK LOSS FROM FIRES.

At the meeting of the advisory board of the New Brunswick Department of Land and Mines, held at Fredericton, it was stated that the present season has been one of the worst on record in the number of forest fires. The department has fought upwards of 300, and the expenditure has been heavy. Two of the fires required an expenditure of $6,000.

The board discussed the quesion in all its phases. The value of the lookout towers, which have been constructed at various points of vantage throughout the province, was recognized by the members of the board. It was decided to proceed with the erection of four additional lookout towers as soon as possible. The department will co-operate with the Geodetic Survey of Canada and private owners.

Chief Forester G. H. Prince was authorized to purchase additional speeders for railway patrol. On account of the number of fires occurring this season as the result of carelessness on the part of fishermen it was decided to press for legislation requiring every angler entering the woods in the fire period to have a permit. The legislation required will go so far as to make it possible absolutely to prohibit anglers entering portions of woodland which may be menaced by fire. It was generally recognized that several forest fires had been incendiary.

The spring burning of brush is to be discouraged, and if possible done away with. Fall burning is to be encouraged. A penalty for a member of a fire fighting crew leaving his work without the consent of the foreman is to be provided.

FIRE FIGHTING BY PLANES.

Experiments in forest fire patrol from the air continue to show encouraging results. Two instances have been reported recently to the Air Board from which the value of the planes in forest protection is well evident.

While flying to Clear Water Lake, Ontario, to sketch timber types, R. N. Johnston, of the Ontario Forestry Branh, and A. W. Carter, pilot, of the Sioux Lookout Mobile Unit, spotted a fire and on the return trip, about three-quarters of an hour later, found it greatly increased in size. Extremely dry conditions in the woods made quick action essential. On arriving at Sioux Lookout at 4.15 p.m., two rangers volunteered to proceed by air to the fire and allowing time for preparations, they arrived at the scene of trouble, 75 miles away at 7 p.m. Working that night and the following day, the fire seemed practically overcome, but fresh winds sprang up and drove it out of control. The plane arriving at 4 p.m. the men returned for provisions and assistance to Sioux Lookout. By using two planes, four men were carried back to the fire, and with the aid of two other rangers who had arrived by trail, it was fought and extinguished within two days.

Another graphic experience was encountered by the Manitoba Patrol which discovered three fires in Manitoba and two over the Ontario boundary. None of these fires was discernible from the ground in its first stages. Taking the only seaplane available at the time, a small machine, Major Basil Hobbs, accompanied by H. I. Stevenson, Acting Forest Inspector, and one ranger, flew to one of the fires and by working from 4.30 a.m. until noon, managed to extinguish it. The other fires were burning in muskeg and were too large to tackle with such a small force. According to the last information received from the district the party returned home and arranged for a larger fire fighting party to return in other flying machines the following day.

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Can the Tractor Drive Out The Horse?

The day of the horse is passing in the logging camps declares the American Paper and Pulp Association.

The cost of the horse compared with the records of the motor vehicle in several recent carefully checked tests, show that the use of power equipment cuts the cost of log hauling as high as 70 per cent.

These figures were presented by practical woodsmen during the recent convention of the Woodlands Section of the American Paper and Pulp Association, who have been forced to substitute power operations for animal hauling by the far greater economy of the motor hauler.

These figures given by these operators apply equally well to lumber operations as to woods camps of the paper industry, for the hauling problem is identical in both types of cuttings.

O. L. E. Weber, of the Watab Paper Company, Sartell, Minn., told of extensive use last winter of tractors, under conditions where horses could not be used at times, but he made his comparison of costs on the basis of horse equipment on passable roads. He figured that a 10-ton tractor would do the work of 36 horses, and a 5-ton machine of 16 horses. He made his cost comparison on the basis of 5,000 cords of pulp wood, 35,000 tamarack and cedar ties, 30,000 cedar posts, and 750,000 feet of Norway pine where he actually used tractors, but where he estimated the cost of horse operation under conditions of previous years. The cost of the job with tractors was actually $3,150. The cost with horses would have been $10,100, including cost of equipment in both cases.

Stanley H. Sisson, of the Racquette River Paper Company, operating in Northern New York, told of hauling 23,000 cords of 16-foot peeled wood 10 to 12 miles, an average of 65½ cords per day per tractor, handling 15,000 cords in 38 days. His comparison with horse equipment was as follows: One team hauling 9 cords per trip, double headers at landings, costing $15.50 per day, or $1.72 per cord. The tractor cost, on a basis of 60 cords, with two trips daily to landings, was $43.06 per day, or $.717 per cord. He, like the other woods superintendents, said that care in repairs and maintenance of tractors was vital to their successful operation, and also urged care in dispatching trains or sleds or wagons, with extra equipment being loaded or unloaded while the machine was on the road.

C. L. Tolles, of the Phoenix Manufacturing Company, of Eau Claire, Wis., giving figures for a steam hauler, with long trains of sleighs, said that the motorized cost was only about one quarter that of horse operations.

E. A. Drott, of Drott & Newall, handling another Wisconsin logging operation, said his motor hauling cost him $1.50 per thousand feet of lumber, board measure, while natives using horses were forced to pay $10, and then failed to get all their timber out. This was on a 10½ mile haul, and on a 7½ mile haul, the motor equipment cost $1 per thousand, as against $7 for horse hauls.

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Sweden Banks on Applied Forestry

By Edward Beck.

STOCKHOLM, Sweden, May 21.—The forest areas of Sweden cover some fifty-five million acres, of which about two-thirds are in private ownership and the rest government owned. The community of interest between the government and the private owners is readily apparent. It manifests itself in close co-operation by both interests for the protection and betterment of existing forests and of provision for their perpetuation. On the surface, at any rate, there is complete harmony. It is true that "the future of Sweden lies in her forests" and that the State is trying to increase its holdings by the purchase of private forests wherever possible, but there is no general demand for the confiscation, by purchase or otherwise, of the private holdings.

All cutting, whether on private or public lands, is subject to the same strict regulations. Private owners willingly submit to whatever rules are imposed for the general good. The nature and extent of these rules and regulations will be dealt with later.

It is of interest to note that the public forests are not sold or leased to private interests as in Canada. When the Government has pulpwood or other standing timber to dispose of its foresters go into the forests and mark each identical tree to be cut down with an individual number. These trees may be scattered over a wide area and separated by considerable distances or they may be grouped together, as circumstances dictate. The right to cut the trees thus selected for cutting is then disposed of at public auction to the highest bidder. There is seldom any lack of competition, as most of the pulp and lumber companies are only too anxious to conserve their own resources by buying when they can buy to advantage.

No Diameter Limit Here.

An outstanding feature of the Swedish timber regulations is that immediate profit from the felled timber is never made the chief consideration. Everything is subordinated to the purpose of ensuring a permanent yield of wood. Selection of trees for cutting is made on the basis of improving the remaining forest. The "diameter limit" regulation, as observed by some of the Canadian provinces, under which all trees cut are required not to fall below a certain prescribed minimum trunk measurement, appears to have no place in Swedish forests. Weak and immature trees are first to be taken out in order to give the sturdier ones a better chance for development. If there is any hard and fast rule employed, it would appear to be that no tree capable of increased development is allowed to be cut until it has reached its maximum growth, unless for the purpose, as already stated, of giving a more promising tree a better chance. There is no such thing as indiscriminate cutting. All waste is eliminated. Trees are cut to within three or four inches of the ground. High stumps

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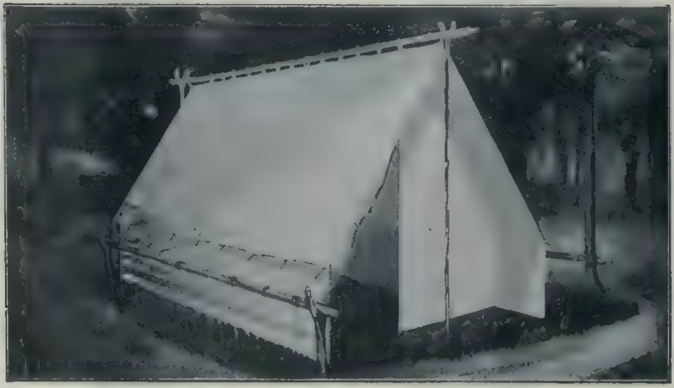

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We shall be glad to answer inquiries in regard to Canadian Government, Provincial and Corporation bond and stock issues.

Our Monthly Review which for many years has helped to keep investors in the United States and Canada in touch with the Canadian situation will be sent on request.

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are unknown. Slash and other debris is never left on the floor of the forest to incite forest fires or serve as a breeding place for wood-destroying insect pests. Swedish lumbermen aim to utilize every waste product from their lumbering operations. Top logs, even down to one or two inches in top diameter, are bundled and strapped with steel wire and floated to the nearest charcoal plant to be converted into charcoal. What waste cannot be utilized is destroyed.

Swedish forests, as a rule, are comprised of about 80 per cent conifers and 20 per cent broad-leaf species. Trees mature under the most favorable conditions in from 75 to 80 years. In some instances, however, they require two or three times as long. Reforestation, which is carried on, on an ever-increasing scale, will be dealt with later.

An important feature in helping to bring about these desirable results is to be found in the fact that the logging in Swedish forests is supervised by the forester. In Canada, in most instances the forestry and the logging departments are separate and independent institutions. They are frequently antagonistic. The former is usually concerned with scientific forestry and with making the most of the raw material; the latter's principal object is to make as many logs at a low cost as possible. In Sweden the forester is in full charge. He will not permit the sacrifice of the future forest even for a temporary benefit of cheap logs. It is a point well worth the consideration of Canadian lumbermen and limit-holders.

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A TREE THREE MILLION YEARS OLD.

(Concluded from p. 382.)

cypresses, pines and spruces, so that the conifers were probably in greater abundance and variety than they are at this day."

From these fossil trees we can restore in imagination about the shores of the shallow Cretaceous lakes and meandering rivers, a forest wall in which the Sequoia was dominant. The forest included no doubt a rich and varied flora. Stately palms with their graceful columns probably formed feathery pictures set in the contrasting foliage of the Sequoias. We know that the fig tree was also a member of the Cretaceous forests. From the summits of the Sequoias down to the ground hung living ribbons of climbing plants of diverse kinds which formed a jungle comparable with some present day tropical jungles.

In the Days of Dinosaurs.

Although the trees of these old forests differed from those of the present, the animals which lived among them differed still more from those of the present fauna. It was indeed a strange assemblage of giant reptilian beasts that lived in and near these old forests. The majority of them belonged to the Dinosaur group. Many of the dinosaurs were gagantic creatures of fantastic appearance. One of these called Gorgosaurus, which has just been mounted in the National Museum when stalking about in the forests in search of pray must have stood at least 15 feet high. Its villainous looking long teeth pointing backwards clearly indicate its predatory habits. Beside its foot prints which were three feet in length those of an elephant would appear almost fairy like. With a body poised like a kangaroo this amazing beast when near its prey was probably capable of leaps of 50 feet. Figure 2 shows the character of the region in which this creature was found. Some of the dinosaurs or those days looked like the last word in preparedness. One of them possessed an enormous shield shaped skull with six powerful horns pointing upwards, backwards and sidewise. Still another of these weird creatures, one of the armored dinosaurs, depended upon its tail as a means of discouraging unfriendly behavior on the part of its associates. This organ terminated in an enormous bony maul-like expansion. When used as a war club this weapon must have wrought havoc among the enemies of its possessor.

In the Museum alongside the Cretaceous tree which has been described, the fossil remains of many of the strange animals which were its contemporaries have been mounted. These include two nearly complete skeletons of dinosaurs, each about thirty feet in length. So perfect has been the fossilization of some of the dinosaurs of this region that the finest details of the curious polygonal scales which covered the skins of the Trachodonts and some other dinosaurs are preserved.

In but few places have the enveloping sands of the rivers and lakes done so perfectly the work of recording for a distant time the history of an extinct fauna and flora as they have in the Cretaceous rocks of the Red Deer River country. Both the trees and the giant subaquatic reptiles which they have preserved for us furnish conclusive evidence of a subtropical climate vastly different from that now prevailing in Alberta.

Canadians will no doubt eventually see to it that these great Cretaceous archives with their intensely interesting records are set aside by which the tourist can find his way into them.

If the study of written human history helps the student to interpret the present and forecast the future, it is not too much to claim that geological history with its vastly greater scope gives him an entirely new conception of the significance and origin of his environment and of the factors in it which evolution is likely to preserve and those which will be eliminated. Palaeontology places in the hands of its students a telescope which enables them to look far back toward the dawn of life and gives them a demonstration of the philosophy of evolution.

They will learn among other things that the most perfect animals from the standpoint of attack and defence ever developed have gone into the scrap heap of evolution. Not a single dinosaur has survived. Their places in the great geological drama have been taken by animals relatively defenceless but with much larger brains.

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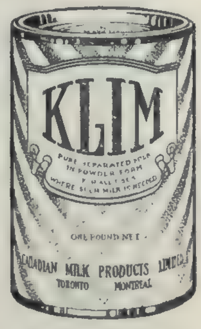

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UNIVERSITY OF N.B. EXPANDS.

Mr. Bertram E. Claridge has been appointed Professor of Forest Engineering at the University of New Brunswick. He will begin his duties September 1. Mr. Claridge is a graduate of the Yale Forest School, and has just completed a year's study in Sweden. Until now the University has been getting along with one technical forester.

A BUSINESS OPPORTUNITY.

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The Canadian Forestry Magazine.

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Trusting you will assist us. Awaiting early reply.

Yours faithfully,

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A Canadian Observer in Norway

By Edward Beck.

CHRISTIANIA, Norway, July 2, 1921 —Norway has been in business of forest cultivation for more than sixty years. In 1907 the golden anniversary of the beginning of Norway's present efficient forestry system was officially celebrated. A volume containing a history of the development and progress of the forests was published. The lapse of sixty years, however, has, according to the leading Norwegian forest authorities, merely enabled them to make a fair start. Norwegian forests, they say, are still in their infancy; cultivation ought to have begun a century before it did. They are hoping to make up for lost time.

There are in Norway, as in Sweden and Finland, both State and private forests. The latter largely predominate. Altogether, the forest lands comprise about 28,000 square miles, or about 23 per cent of the country's total area which consists of about 124,450 square miles. Compared with Canada's forest area that of Norway appears almost insignificant, yet Norway regards her forest possessions as of the utmost importance and spares neither money nor effort to keep them in a state of constant production. Her national vitality depends upon them.

Norway's natural resources are strictly limited in extent. The surplus of timber ranks among the first and most important. It furnishes the main source of Norway's export trade and provides fuel, building material, and other wood necessities for home consumption. One-sixth of Norway's laborers find their employment in the wood-refining industries; one-tenth in the paper industry. Norwegian railways derive more than 12 per cent of their total traffic revenues from the pulpwood, cellulose and paper industries; some of the railways depend almost exclusively upon the revenues so derived. Appreciation of these facts has not only led Norway to the adoption of a policy of strict observation of her remaining forests, but also to employ all available means for the building up of a forest supply for the future. Today the country is not forest self-sustaining and is obliged to import considerable quantities of wood from Finland. Formerly wood was also freely imported from Russia.

The State Dominates in Forestry.

The productive timber lands of Norway consist of about 21,825 square miles, of which 11,500 are held by peasants and other small owners, 5,575 by incorporated companies, and 4,750 by the State, the latter including communal lands, parish and other endowments. The tendency at present is to discourage the further acquisition of forest lands by private owners. Incorporated companies are, in fact, debarred by law from increasing their holdings by purchasing lands from peasants and other individual holders. Wherever possible and practicable the State is resuming ownership of these lands and using them to build up new forests.

Private ownership in the past, before the State established control of the forests, was charged with wasteful methods and irresponsible care, resulting in depleted and sterile forest lands. These practices are what led to the present national forest policy. The private owners of today, however, need no restrictive laws to compel their lesson. The forest lands owned by the incorporated companies in Norway are the best kept of any, as well as the most prolific in their annual yield. The companies spend much more proportionately than does the State on their upkeep.

However, Norwegian forest laws do not

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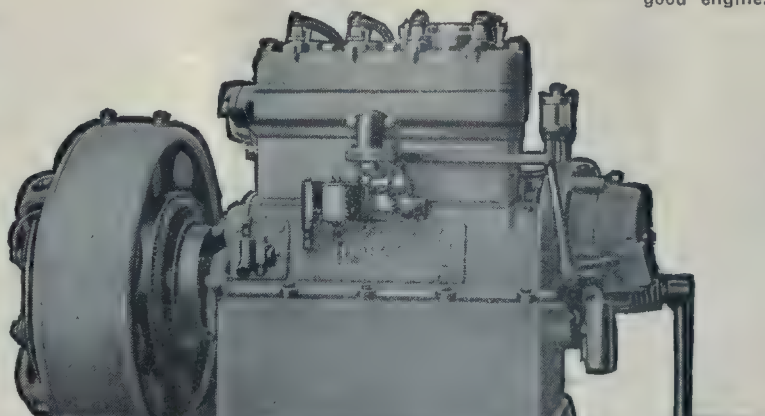

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leave it entirely to the owner to say what shall be done. The owner cannot do as he pleases with his woods. All cutting is done under government prescribed regulations. So-called clean-cutting, which is permitted in Sweden and Finland under certain conditions, is practically prohibited in Norway. Selective cutting is the only approved method. All cutting is done with regard to its effect upon the standing forest, rather than for the immediate yield. Norwegian foresters are unusually successful in maintaining their forests by natural means. Seeding and planting are seldom resorted to, cutting being done in such a way that Nature replants the cut-over area in a remarkably short time, maintaining the forests in a state of constant development.

The State and the private owners work well together and the results obtained are of the best. Violations of the regulations are very rare. The State is also generous in its support of the forest industry generally and does everything possible to encourage its development.

Coniferous timber areas are estimated to represent about 82 per cent of Norway's total productive forests, Scotch pine and white spruce constituting the principal species. The State Forest Department, which administers the public forests and supervises the administration of those privately owned, is now engaged in completing a survey of the country's total timber resources which, when completed, is expected to lead to further restrictions. An unofficial estimate, covering thirteen million acres of productive forest lands, gives an average of 9.2 cords per acre, or approximately 3,675,000 cords. The total annual consumption, exclusive of imports, has been calculated at about 1,320,000 cords for the wood-using industries and at about 4,765,000 cords of the wood used for fuel, for construction and other domestic purposes is taken into account. According to this calculation Norway is consuming annually from 25 to 30 per cent more wood than its forests are yielding. This is generally admitted by Norwegian foresters. They say, however, that the discrepancy will be overtaken by the development of new forest areas now under way. For the present, expansion of the saw-mill industry has stopped. A decline in other classes of wood products during the next few years is generally anticipated.

As already indicated, more than half of the productive forest lands of Norway is represented by small holdings, principally peasant properties. The small proportion owned by the industrial companies represents land acquired many years ago. Most of the pulp and paper companies of Norway have to depend upon purchased timber for their raw material, a development which, according to some of the companies, places them at a distinct disadvantage in comparison with similar companies in Canada.

Perfect Co-operation.

Competition between Norwegian wood-buyers for the available supply of domestic pulp-wood is becoming increasingly keen. Most of the mills are located in the south-eastern part of the country on the Glommen, Drammen and Skien rivers, which afford access through the water connections with the best timber areas of southern and central Norway. Contracts for wood supply are made to run from six months' periods and call for delivery of the wood at the river bank, roughly barked and cut to standard lengths. Timber is scaled and stamped by the purchasers' agents or through competitive timber-driving associations which handle all the timber floated on the principal rivers. Cost of handling wood from point of delivery to mills are pooled and distributed on the basis of quantity and distance. Both buyers and sellers are organized, but conditions do not favor the elimination of competition altogether.

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THE ILLUSTRATED CANADIAN FORESTRY MAGAZINE

VOL. XVII. OTTAWA, CANADA, OCTOBER, 1921. No. 8

419

The Aeroplane's Service to Forestry

A Record of Actual Tests in Fire Detection, Survey of Wind Damage, and Cutting Costs of Fire Fighting.

By Major L. A. Andrews, Regional Forester, Vancouver.

Commercial flying has made rapid and permanent advancement during the past few years. Types of machines have evolved from those suitable for War purposes stripped to the bone for speed, weight-carrying or fighting to those more suitable for passenger and freight transportation and the latest machines are models of comfort and luxury.

The safety factor in construction is not now sacrificed for other consideration and reasonably priced insurance is easily procured in the Old Country, where travel by air has become well established. At the present time over fifteen different lines operate daily out of London and Paris on published time tables, fog being the only element of uncertainty or danger. Accidents are very few and the risk is little greater than by boat, train or motor.

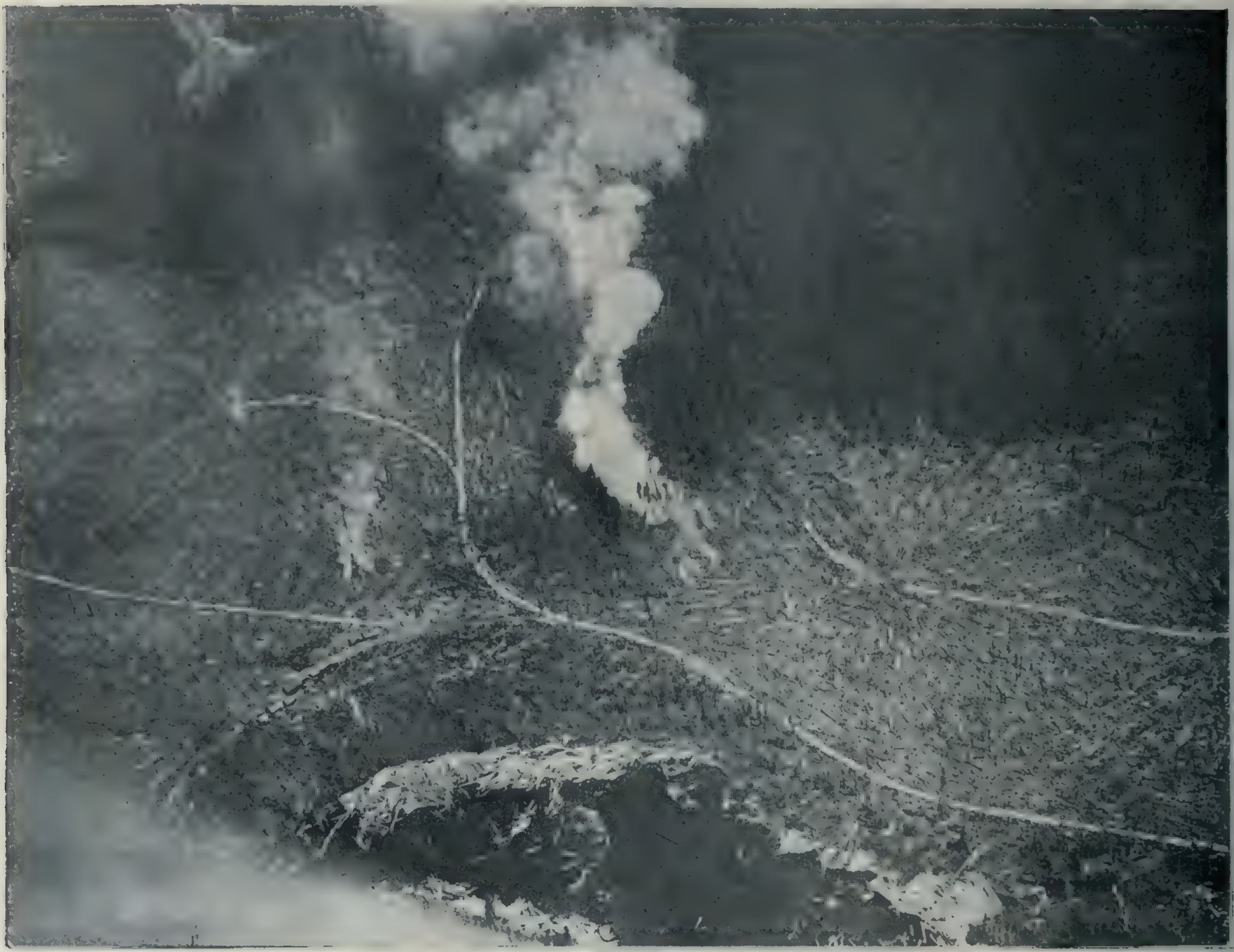
The short period of joy riding on unsuitable types of machines which followed the termination of the War and gave flying a black eye for a time has passed. Flying is now done to accomplish certain definite objects to obtain accurate information quickly and to travel more expeditiously.

Flying on the Pacific Coast has followed the general trend and is now carried on in a sane businesslike basis. The Seaplane base established last year by the Air Board for the development of civil flying has undertaken and carried out a large amount of work covering a wide field. One of the principal uses of Government work carried out on this coast has been flying in connection with Forest work.

Before going into the subject, however, I wish to express a few words in appreciation of the efforts of Major MacLaurin who is in charge of Government flying operations in British Columbia. The efficiency with which his flying station at Jericho Beach was established and gear assembled for flying is generally recog-

Photographed in flight. An F-3 Flying Boat, with two Rolls Royce 360 h.p. engines. This machine can carry a fire fighting party of twelve men with necessary equipment.

Unloading Supplies carried by air to fire fighters near Roberval, P.Q.



The first stage of a developing forest fire in British Columbia as seen by aeroplane. Photograph by courtesy Dominion Air Board. See opposite page.

nized as well as the sane businesslike methods on which operations have been conducted.

There have been no accidents to any of his machines. There have been no failures to get to any place set out for, and the Major has been on the job all the time to co-operate in every way possible with the various departments with which he has to deal. The successes of the past season have been largely due to his personal supervision and a great deal of the actual piloting has been carried out by himself. I am told that machines from this station have flown over 30,000 miles this year.

A Seaplane base was established with the object of developing Civil Flying, in 1919, at Jericho Beach, Vancouver. The special work to be undertaken included inspection trips for the Federal Customs Department to check smuggling and check dope traffic, inspection and supervision of coastal fishing industry for the Fishery Department to enforce the regulations, co-operation with the Dominion and Provincial Departments for geodetic survey, water reconnoissance, forest work and other departmental field activities.

In describing plans, results and conclusions on the use of aeroplanes for forest work, a short outline of the general forest problems is necessary and in this I have to confine myself to the Vancouver Forest District.

This particular Forest district extends from the International Boundary north to Cape Caution on the Mainland, including the Fraser Valley as far east as Hope and the Mainland Coast Inland to the Height of Land of the Coast Range. It includes the whole of Vancouver Island. There is approximately twenty million acres of territory within these boundaries. The stand of commercial timber in this district is estimated at 172 billion feet Board Measure, or about one-half the total estimated stand for the whole Province, according to the Reports of the Commission of Conservation.

Forest Problems.

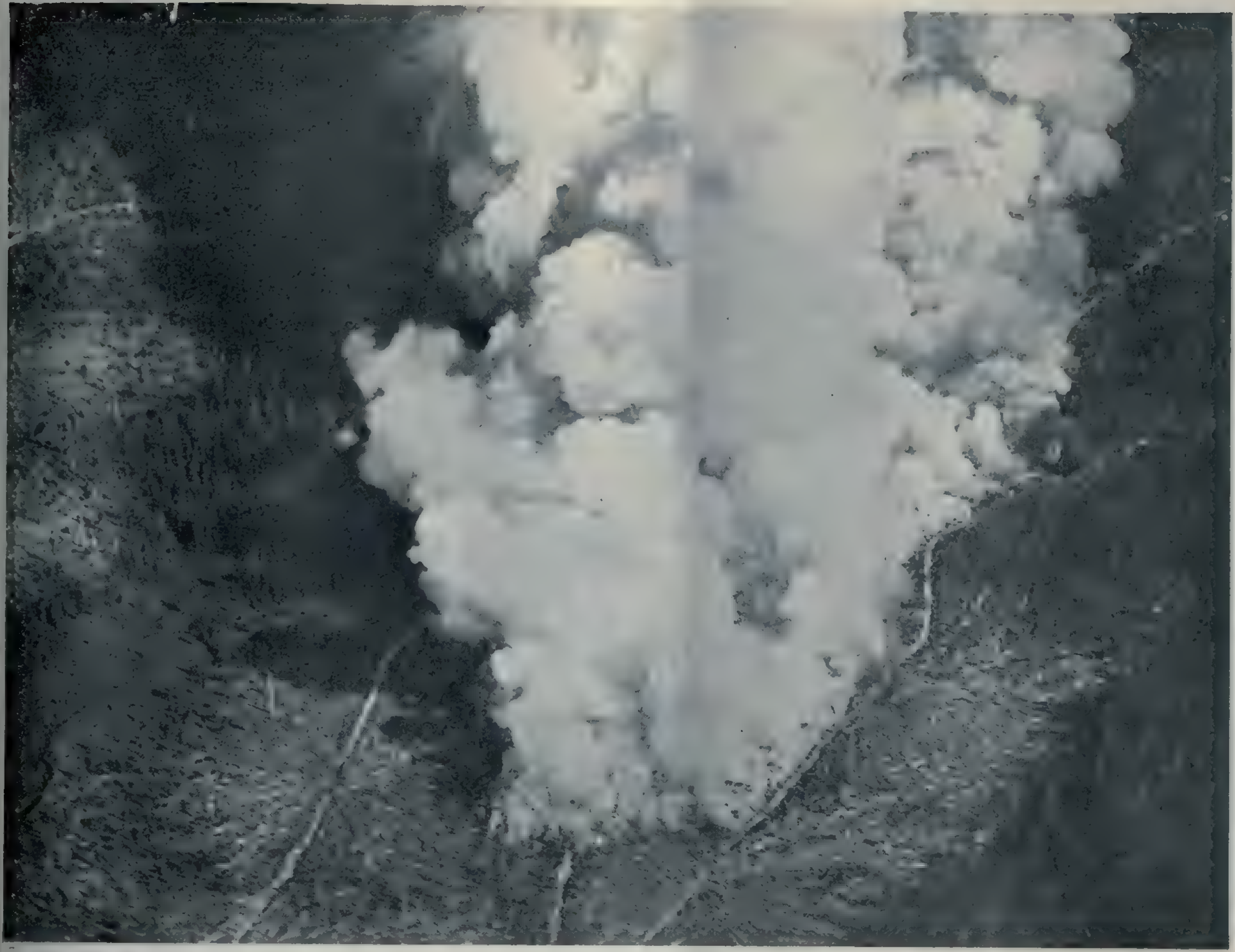
Protection of this timber resource is naturally the first consideration of the Forest Service. Administration of the Forest Laws and the everyday conducting of the Department's business comes next because the Government has a real equity in every acre and every foot of standing timber, the money for which is collected annually as the timber is cut. Concern for the future is the third big problem which requires research and investigation into actual growing conditions for the replacement of what is cut.

Organization.

The following organization is maintained. A headquarters staff located at Vancouver is in direct charge. Spread over the district are four Supervisors, nineteen permanent Rangers and twenty-one Scalers. During the Fire Season twenty-eight Assistant Rangers, twenty-two Patrolmen and fifty Honorary Fire Wardens are employed. For the transportation of this staff twenty-five launches are in use, nineteen Ford Cars and three Speeders, and a small number of saddle horses.

Fire Protection.

The fire hazard in this district is usually of about five months duration in the Summer. Some 50,000 acres of new slash are created annually from the cutting of 1 billion feet of timber. Some 800 to 1,000 logging camps employing 10 or 12,000 men are operating in the timber using 350 to 375 steam donkeys and locomotive engines. Pre-emptors clearing land,



Gaining new power every minute! This Photograph well illustrates the power of the seaplane scout to observe and report on the progress of a forest conflagration.

campers and travellers attracted by the good roads and fine climate, lightning and various other causes start from 300 to 1,000 fires each year resulting in an annual loss of hundreds of thousands of dollars.

In efficiently handling the fire situation, quick detection, quick and reliable communication and quick transportation are essential. All fires are small at first. Every delay in getting to them increases the difficulties of control and directly increases the cost. To a large extent the solution of the problem therefore depends on the development of communication and transportation facilities, as well as a steady development and increase in the use of mechanical equipment, such as portable fire fighting pumps, cars, boats, tools and aeroplanes.

The supervision of this field staff also s a matter of serious concern. One-half the force on fire protection are temporary employees, and being spread over such a large territory, control is a difficult matter.

The use of Aeroplanes on this phase of the work was, therefore, considered to be of great importance.

Administration.

The general administration or carrying on of daily business includes the supervision and inspection by the Field Staff of 250 small timber sales monthly, inspection of 800 to 1,000 logging operations quarterly and inspection of 900 to 1,000 pre-emptions yearly. In addition the cruising of 50,000 acres of timberland and the examination and classification of 20,000 acres of forest land is carried on annually. One hundred million feet of timber is scaled monthly. Supervision of export, building of improvements, are some of the other activities. The supervision of this work is a big task scattered over so much country which is difficult or slow of access and the use of aeroplanes was considered feasible, and was one of the big reasons for advocating their trial on this Coast.

What can be Seen from the Air.

To a trained observer the ground from any height is an open book as far as the general physical features of the country go. With his map on which the name of places, islands, inlets, etc. are marked, he can locate his position absolutely at any moment. If his map be accurate and of a reasonably large scale, he can read the ground in perspective, and roads, trails, railroads, towns, farms, blocks of timber slashings, etc., take on a new meaning by reason of this. In the final analysis his map is just the accurate diagram of what he sees, and while survey lines may not be actually seen, their approximate location on the ground is apparent in relation to the configuration of the ground. For example, he can pick out a 40 acre plot with absolute accuracy by following a shore line, or the junction of two creeks or the intersection of railway lines, roads or trails or its proximity to a hill or pond or island, which stand out clear and plain as on a diagram.

With experience he is able to pick out small objects which may hardly register on the eye as evinced during the War, when the most careful camouflage of a gun pit or ammunition dump was spotted.

It is more a fact that the human mind is not able to retain a tithe of what is actually seen than that not enough can be seen. For this reason in order to justify the expense of flying for reconnoissance purposes, photography must be employed largely to record the information obtained.

The reading of aerial photographs is an exact science and requires a highly trained specialist.

How often did the poor Pilot in France come in with a set of pictures only to be

Patrolling the timber areas of the Rocky Mountains with Major MacLaurin.

A good example of the unobstructed view obtainable from a flying machine. Forest fires up to a distance of 50 miles have been "spotted" and reported to headquarters.

sent out next day to a grind of artillery observation to shell a dump or guns, the existence of which he had only the merest suspicion but which were actually plotted on his map from the photographs. The actual depths of trenches, height of obstacles were measured in many instances and the actual inch contour maps made of tides and depths around Zebrugge and Ostend, which were compiled by the Naval Air Service before the Zebrugge show. These are concrete examples of the exact nature of what is possible.

Survey of Forests.

Many problems still remain to be solved before accurate survey of any considerable area of ground can be done by aerial photography. Owing to the varying height of the camera and, therefore, varying focal length, at the time the pictures are snapped due to uneven air currents, a variable unknown is introduced into the plotting from a mozaic composed of many separate plates, also owing to a warping of the plane in which the pictures are taken due to tilting of the machine while the plates are being snapped.

However, for extensive reconnoissance the aeroplane presents many valuable features. Large areas of country can be covered at low costs and in quick time. In the case of timberland, the information as to percentage of species, density of stand, size of timber, topography suitability of the tract for logging, general classification into types, etc. **is there** on the photograph if it can be read. Accurate cruising, however, is doubtful as the factor of quality and defect, unless the stands and types are uniform and the percentage defect and quality is known. Where the stands are fairly uniform as in the cedar type around Drury Inlet, species stand out very clearly and the percentage of cedar is easily determined. In this connection an experiment has been carried out to obtain a basis for work of this kind. An area of over 2,000 acres which had been recently cruised was photographed from the air. The cruise was conducted on the 20 per cent caliper method and special time and effort made to include all possible detail. The aerial photographs will be tied into this topographic map and a basis for reading timber from aerial photographs worked out.

An incident occurred while this work was going on, which was interesting to note. On the first flight over the area it was noted that an additional area of 390 acres was apparently vacant Crown Land and should have been included within the boundaries of this 2,000 acre sale. This was checked up on the ground and subsequently cruised adding to the original sale about nine million feet of timber.

Flying Plans for 1921.

Under the co-operative agreement between the Dominion Air Board and the Department of Lands, a portion of the 200 hours covered by the Government's commitment to the support of flying was allotted to this district. This was divided between the various branches of our work after deducting about 10 per cent of flying time available for training of our personnel, to get them used to air work and on preliminary investigations.

Forest Protection.

Fifty (50%) per cent of the total flying hours available was set aside for Forest Protection work. A system of bi-weekly patrols was lined up for the months of July and August.

Patrols were to be carried out on Wednesdays and Sundays. Each trip to consist of a circuit from the Vancouver base following the Mainland Coast and diverting inland to get a view of the heads of the various deep inlets north to Bute Inlet, landing at Thurston Bay repair station. The return trip south following the East Coast of Vancouver Island returning across the Gulf from as far south as Saanich Inlet.

(Continued on page 459)

Have You a Shade Tree Needing Repairs?

Practical Instructions for the Amateur Tree Owner. How to Remove Decayed Limbs and Restore Wounds in Trunks.

By B. R. Morton, B.Sc.F., Dominion Forestry Branch, Ottawa.

Removing Branches.

In tree repair work it often becomes necessary to remove certain branches. All small dead or decaying branches should be cut off, since it is through them that the decay may spread to the healthy limbs and trunk. In the case of very large limbs showing evidence of decay, their removal will depend on the extent of the decay and the degree to which the tree will be disfigured by the removal. If the decayed area is extensive and the loss of the limb will not be particularly noticed, it will be simpler to cut off the decayed portion or even the whole limb rather than attempt to restore it. When only a portion of the limb is removed, the cut should be made far enough away from the decayed area to be through sound healthy wood (Fig. 1). In removing an entire branch, large or small, it is important to make the cut close to the base or shoulder of the branch and that the plane of the scar be nearly parallel to the axis of the limb or trunk from which it developed.

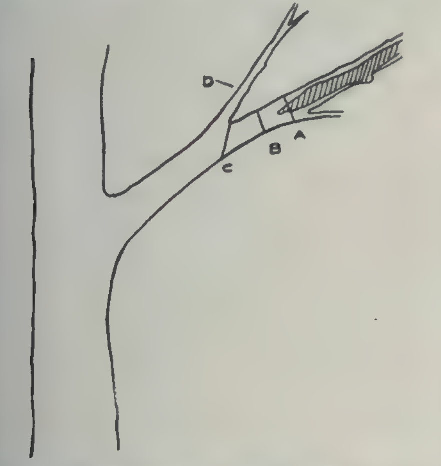


Fig. 1.—In removing a decayed portion of a limb to cut should if possible be made at some point as indicated at C immediately in front of a vigorous young branch D. If the cut is made at A it will not remove all the decay, and if made at B it will leave a projecting stub which will be slow to heal.

If the cut is not so made a projecting stub remains, which is not only unsightly but a source of danger to the tree. Stubs heal very slowly. Often they do not heal at all since they receive little or no food. The leaves which would ordinarily have manufactured the food for this portion, were removed with the portion cut off. Such stubs, therefore, dry out, die, and through them the decay producing fungi get a start. When the cut is made properly at the shoulder of the branch (Fig. 4), there is a better chance for the new growth to develop and cover the wound.

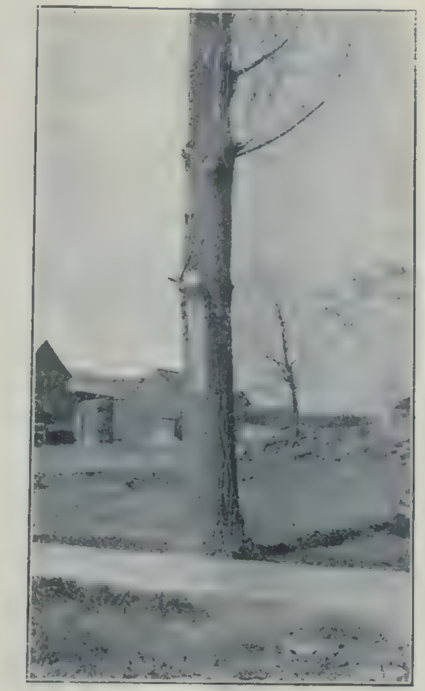


Fig. 3.—Showing injury by stripping bark due to attempting to remove limb with single cut.

When removing a branch care must be taken to avoid causing an unnecessary large wound by splitting. If one were to make a single cut as shown in Fig. 2, the weight of the limb might cause it to split near the end of the cut and serious injury would be caused by the stripping of the bark. There is no special difficulty in removing the small light branches where the weight can be supported with the hand, but in the case of the heavier limbs extra precaution must be taken. One of the best methods of removing a heavy limb is indicated in Fig. 4. Begin by making an under cut about half-way through at 'A' about 10 or 12 inches from the shoulder. Make the next cut close to the shoulder and saw half-way through as shown at "B." Remove the saw and make the third cut on top at "C" a little beyond the under cut "A." Continue this until the limb drops off. Then finish cut "B" and support the stub while doing so.

It might be stated here that the immediate return of vigour and apparent new lease on life that is shown by an old tree after having been repaired is due more often to the pruning it has received than from any other repairs.

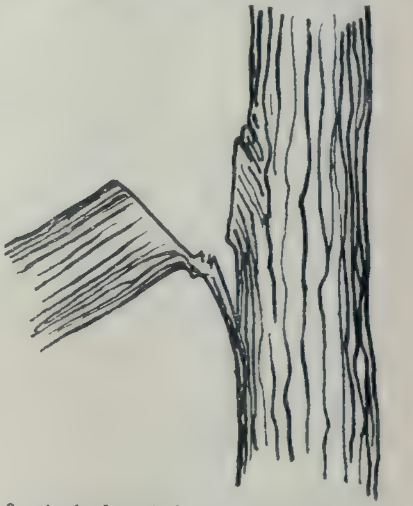


Fig. 2.—A single cut through a heavy branch may strip the bark. Avoid this by making cuts as shown in Fig. 4.

Treatment of Wounds.

All wounds, whether they are caused accidentally or the result of repair work, should receive treatment immediately after they occur. Promptness facilitates the healing and in many cases reduces the

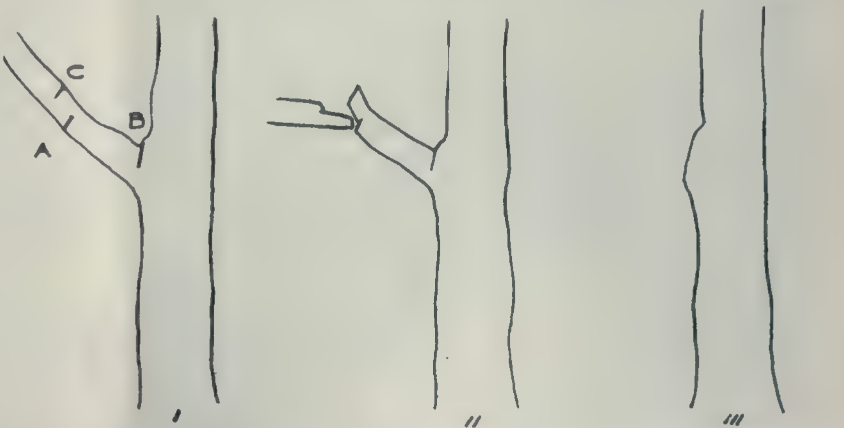


Fig. 4.—Method of removing a heavy limb. Make first cut half way through at (A) on the underside. Make second cut about half way through at (B). Make third cut at (C) until limb drops. First cut (B) and remove stub.

size of the wound and consequently extensive treatment later.

There are four operations in treating wounds: (1) trimming, (2) shellacking, (3) sterilizing, (4) waterproofing.

Trimming Wounds.

In the case of freshly made wounds, the border of the wound is frequently left in a ragged condition by the saw or other tool used. To facilitate the formation of the callus or new growth by the cambium, it is advisable to trim the margin smooth with a sharp knife. Wounds which are somewhat square or broadly rounded in shape at the upper and lower edges will in many cases heal more rapidly if they have been slightly pointed, as indicated in Fig. No. 5a. The shape of the wound affects the rate at which the cambium can form a new growth over it. Wounds with their longer diameter parallel to the axis of the trunk or limb will heal more rapidly than those which have it at right angles to the axis, since new wood is formed more abundantly on the side of the wound where the greatest flow of food passes, (Fig. 3). This fact should be borne in mind whenever making an opening in a tree to remove any decayed portion as will be described later in these articles.

In the case of large irregular wounds such as frequently result from accidents, as the scraping of wheel hubs against the trunk or the biting of horses, all ragged projecting tongues of bark should be cut off and the margin trimmed smooth with a sharp knife, somewhat after the manner indicated in Fig. 6. In the case of old wounds of the kind where there is evidence of a new growth forming, this trimming may not be necessary. All dead projecting strips of bark, however, may be removed.

Shellacing Wounds.

When a cut is made through healthy fresh bark and wood, the cambium layer about the margin will usually dry out and as a result, die back from a small distance under the bark. As far as possible this should be prevented, for it simply means a large area over which a new growth must be formed. A coat of shellac applied immediately after the cut is made will do much to prevent this drying. If the margin is to be trimmed smooth, as is usually advisable, the shellac should be applied immediately after the trimming. Use a brush and spread the shellac gently over the edge of the bark, cambium layer and adjoining sapwood. If the margin of the wound is very wet with sap it may be necessary to allow it to dry slightly first. The best results, however, are obtained if the delay is not more than two or three minutes. In the case of a very large wound this shellacking and trimming should be done at the same time. That is, trim only a small portion at a time and immediately apply the shellac, and after this fashion gradually work around the whole margin. This method will prevent any portion drying while the remainder is being trimmed.

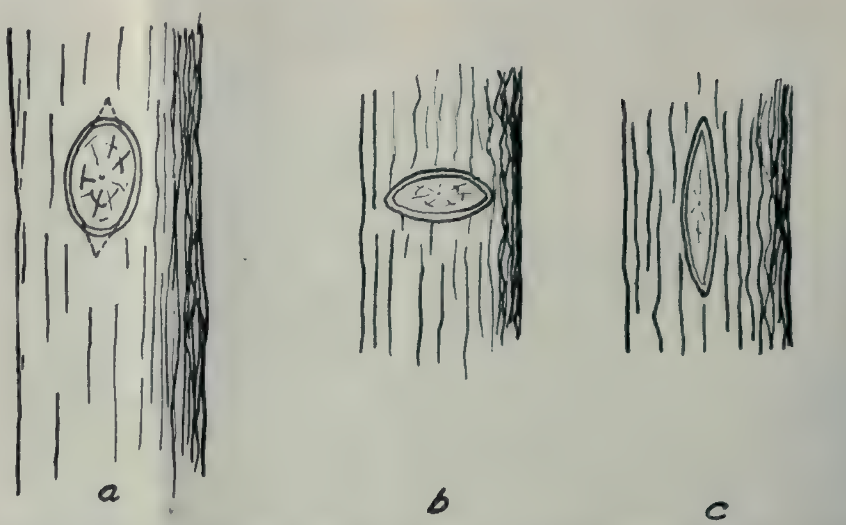


Fig. 5.—Wounds with their longer diameter parallel to the axis of the trunk or limb (c) will heal more rapidly than those which are at right angles (b). Slightly pointing broadly rounded wounds as indicated at (a) will assist the healing.

Disinfecting Wounds.

After a wound has been trimmed and shellaced, the next step is to disinfect the surface so that any spores of decay producing fungi which may have become lodged on it, will be destroyed. There are several materials which may be used for this purpose. They include creosote, copper sulphate, (blue stone), bi-chloride of mercury and formalin. Creosote, the product derived from the distillation of coal tar and which can be purchased from many paint dealers, is perhaps the most widely used. It should be applied with a brush over the entire surface of the wound. It is very penetrating and therefore some tree repairers object to its use near the margin of the wounds because of the danger of its killing the cambium. On large surfaces, however, it can be applied without much danger. If there is any fear of this injury, a copper sulphate solution made of one pound of copper sulphate to 3 gallons of water may be used. Or else, use the bi-chloride of mercury solution in the proportions of 2 ounces to 15 gallons of water, or a 7 grain tablet to a pint. The bichloride of mercury is exceedingly poisonous if taken internally. Also it is a corrosive agent and should not be kept in a metal retainer or allowed to come in contact with the skin. Formalin may be used diluted, 2 ounces in 2 gallons of water.

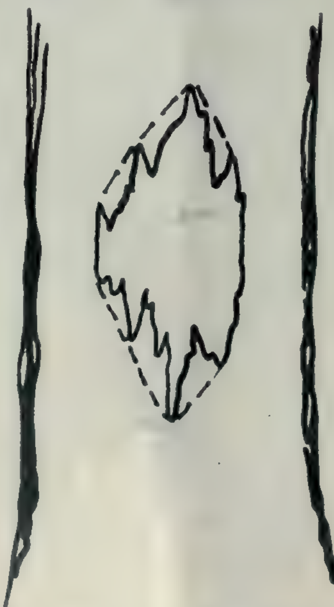


Fig. 6.—Ragged bark wounds should be trimmed as indicated by the dotted lines as soon as possible after the injury is received and treated as described in text.

Water-proofing Wounds.

The time it takes a scar to heal completely depends upon the size of the wound and the vigour of the tree. Some species which are rapid growers, such as the cottonwood and willow, can heal a scar in one-quarter of the time it would take a sugar or oak to accomplish the same result. On a large wound it may take many years for the callus to overgrow the scar. During this time, if the bare wood is exposed to the weather it dries and checks and affords an excellent starting place for decay-producing fungi and an entrance for boring insects. The disinfecting solution is not a permanent dressing and cannot be is not a permanent dressing and cannot be depended upon to keep such pests from gaining an entrance through the cracks formed by the checking. It, therefore, becomes necessary to apply some kind of a more permanent nature. On small pruning wounds, not over half an inch in diameter, the new growth may be so rapid that water-proofing is unnecessary, but on large wounds it should always be done.

The materials most commonly used for this water-proofing coat include paint, asphalt and liquid grafting-wax.

A good quality of paint made of pure white lead and linseed oil makes a satisfactory coat for small wounds which will heal rapidly, and where the surface is

(Continued on page 458.)

A Successful Tamarack Plantation in Saskatchewan

So little is known of the possibilities of native trees when grown in plantations that this record of growth of Tamarack is of value. The eastern Tamarack has not appeared extensively in the lumber market because of the almost complete destruction of the mature timber by the sawfly, about thirty years ago. A young forest has sprung up quite widely over its original range and by its growth promises to produce merchantable timber at an early date. Tamarack is the hardest and heaviest of the northeastern coniferous timbers.

This plantation of 6.8 acres was established in 1908 at Walseley, Sask., by the Forestry Branch of the Canadian Pacific Railway, from native Tamarack stock obtained from a muskeg near Molson, Manitoba. The stock was about six years old when collected, and was planted three feet apart in rows four feet apart. The object of close planting was to get an early cover on the sandy loam soil.

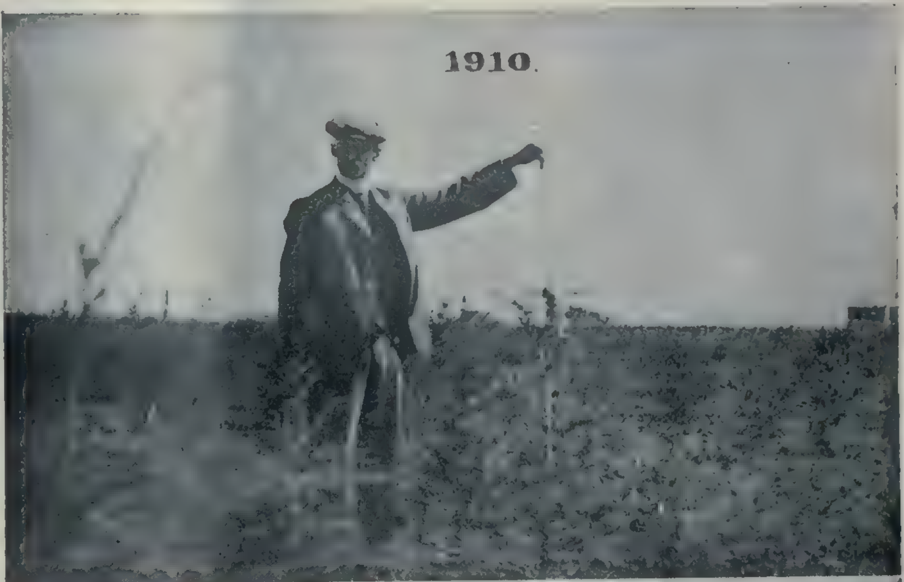
After the close of the growing season in 1914, one hundred and ten average trees were measured and tagged. They were remeasured in 1915 and again early in 1921 before the current year's growth had taken place. Ten trees showed broken tops, and nine others were dead or could not be located in 1921.

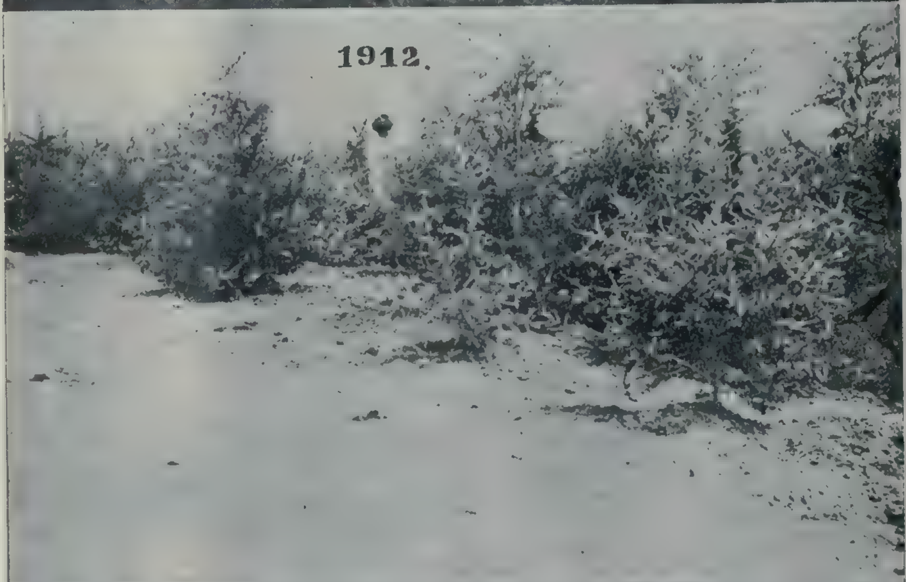
The average of 99 trees in 1914 shows a height of 12 feet and a breast-high diameter of 2.26 inches. The average height of these same trees six years later is 18.5 feet with an average diameter, breast high, of 3.33 inches. This gives a diameter growth of one inch in 5.6 years and an annual height growth growth of 1.08 feet. The total volume of the average tree in 1914 was .193 cubic feet and .553 cubic feet in 1921.

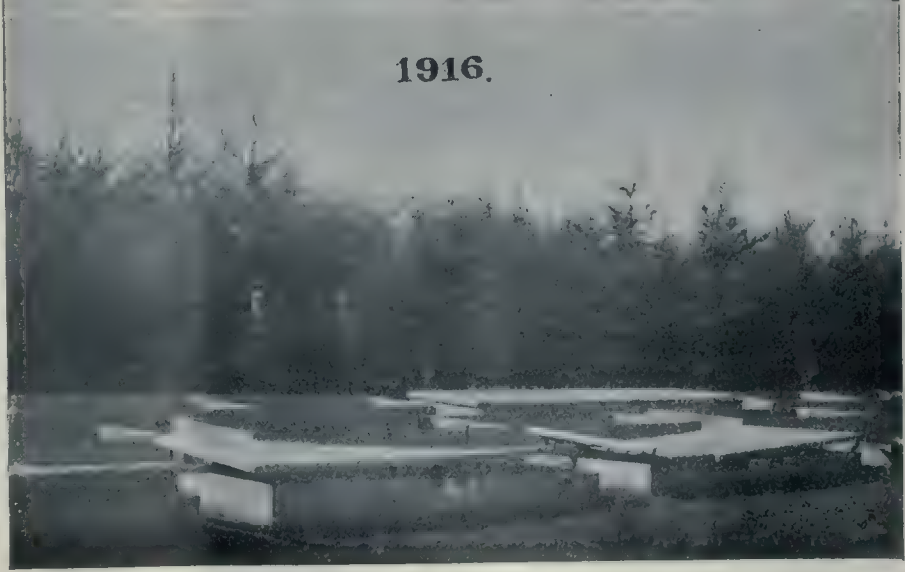
Computation of volume growth for the complete plantation is made difficult by uncertainty in the record of the number per acre. The crowns of the trees have closed and were crowding to an extent that made a thinning necessary in 1921.

Trees in this plantation may be expected to make a greater annual height growth in the immediate future than that shown by the measurements.

This species has thus far made a satisfactory growth, and has established a cover over the soil which will check the loss of water by evaporation from the soil. Later measurements will doubtless show an equally satisfactory volume growth of wood per acre.







Helping the Prairie Settler With his Tree Problems

The Tree Planting Car of the Canadian Forestry Association with Messrs. Archibald Mitchell and Angus Cooch in charge drew into Moosejaw early in October to close the Tree Planting Campaign on the Prairies for 1921. Last year this unique enterprise attracted something over 10,000 people to the lectures and the demonstrations. This year the total number of prairie settlers and townspeople attending the lectures, and demonstrations, or seeking consultations with Mr. Mitchell, reached 48,676.

With the exception of $1,000 donated to the Tree Planting Campaign by the Saskatchewan Government, the remainder of the money was contributed by a small group of agricultural and private individuals and mercantile companies in the Western provinces, to whose generosity in a discouraging business year the progress of the Tree Planting Campaign is due.

In the following narrative, Mr. Angus Cooch, who assisted Mr. Mitchell in the campaign, describes in an intimate manner the types of Western citizens encountered and the difficulties and encouragements that lie ahead of the prairie tree planter.

"First of all we have the man who has a fine plantation around his home grounds. A successful tree planter! He is eager for more information, listens attentively to the lectures and during the discussion period asks questions freely. Has a fine place himself, is proud of it, and not afraid to tell the whole countryside, if necessary. This is the ideal type; a few in every district and it would not be long before a great change would come over the present landscape of telegraph poles and barbed wire.

"Then we have the unfortunate man who planted trees and had them die on him. He comes to the lecture firmly in the belief that trees won't grow on the prairies but on proving to him through stereopticon views of well treed prairie homes that trees can be grown almost anywhere, he wants to know why he failed.

"The causes of failure are numerous, but the chief one without a doubt, is the lack of information the average western farmer has had on this subject in past years. He has been doing his best under the circumstances, working without information or local inspiration, and going purely on the natural instinct of one who was brought up in a treed country. Unfortunately for this pioneer, his efforts in many cases are doomed from the outset as his lack of knowledge of local conditions and general information on prairie forestry, is too big a handicap to surmount.

The women of the Prairie Farms are taking hold of the tree planting cause. The scene shows 120 women in the Lecture Car of the Canadian Forestry Association.

"Trees won't grow," he says. We ask him why? and find out during the discussion that the land was'nt properly prepared; the mixture of the plantation was poor; the wrong varieties were used; he was importing his trees from Ontario or the United States where they had been grown in a lower altitude and different growing conditions; planting was slack; trees too far apart in the plantation; or he had allowed the grass to get the stronghold while the trees were in their infancy. These points were all thoroughly discussed with him, reasons given for everything and his own particular problem or failure sifted right through to the bottom. "If I had only known this when I first started to plant," he would say, "But, I'll start again and this time it will be in the right direction." Thus another convert was secured, and one, who with his newfound confidence in Tree Planting is ready to join the ranks of successful planters.

"Then we have the pessimist, he, who has'nt got bush around his place, never planted a tree in his life, never tried and is positive they won't grow on the prairie. "Why" he says, "if the Lord meant trees to grow on the prairies, why was'nt the country covered with trees when I came here." We ask this man if he has any wheat on his farm, and if so, did he find it growing there when he first came to the country? We then explain to him that the Lord is rapidly putting the trees back on the prairie and draw his attention to the Aspen Poplar bluffs increasing every year on all sides of the prairies. Then we tell him about all the successful plantations, show him the pictures, of places growing right on the bare bald prairie and if we can't convince him at that we at least feel as if he has got enough information to start him thinking ultimately in the right direction. Fortunately the Westerner is an optimist and the pessimistic breed are few and far between; the country has no welcome for men with blue goggles.

"For a certainty, the Tree Planting Car has been of mammoth service in advising thousands of settlers with regard to cause of failures and discouragement and in encouraging planters to carry on, as well as those who have never planted to put their new inspiration into action. A tremendous increase in planting cannot be expected right away; that depends on so many different conditions, but good missionary work has been done and there is no doubt more men are thinking of tree planting and putting new projects under way than ever before.

The supply of trees for reforestation on the Dominion forest reserves was obtained largely from the nursery stations at Indian Head and Sutherland, Saskatchewan, but, in order to develop such work on the forest reserves convenient to the places where the planting is to be done and in order to give training in forest nursery and forest planting work to the staffs on reserves where planting is necessary, small nurseries have been started on several of the reserves. These reserve nurseries will not be increased to large dimensions, so as to be general sources of supply, but will be developed to serve the full requirements of the reserves on which they are situated.—Annual Report, Director of Forestry, Ottawa.

Wireless Telephony a Success in Forest Protection

By R. V. Stuart, B.C. Forest Protection Service, Vancouver.

Previous to 1920, the Forest Service of British Columbia had considerable mileage of ordinary pole and tree telephone line which was tied to the lines owned by various telephone companys of the Dominion Government. Communications were fairly good except on the lower coast where patrol is chiefly by water. Here the men on the launches were always more or less out of touch with headquarters. During the war we heard reports from time to time of the success attained in wireless telephony, and it seemed that if it could be adopted to meet our requirements, it would be an ideal system of communication for the Coast which, on account of the deep indentation, renders ordinary telephone construction difficult and costly.

Arrangements were made with the Marconi Wireless Telegraph Company and other companies for a series of tests in the spring of 1920, and as a result, a contract was given to the Marconi Company to erect three land stations, and to equip five of our patrol launches. The land stations are located at the Court House, Vancouver; Myrtle Point, about 75 miles north of Vancouver, and at the Forest Service Marine Repair Station at Thurston Bay about 130 miles north of Vancouver. This year an additional launch was equipped making six launch units in all.

The land station installations consist of a one-half kilo-watt valve unit set, both transmitting and receiving gear is contained in a lockup cabinet, similar in appearance but of smaller dimensions than an ordinary piano case. Power to operate the set can be taken from the regular city power supply or it can be engine driven. In Vancouver we use power obtained from a 7½ kilowatt motor generator set in the Court House. At Myrtle Point, a 6 H.P. Heavy Marine Engine supplies the necessary power and at Thurston Bay the unit is driven by a small hydro-electric installation. The land stations have an average range of 80 miles, although it is frequently as high as 125 miles, according to atmospheric condition.

The equipment installed on the launches consist of 1 100 watt transmitting and receiving set having a range of 50 miles, and is arranged in compact cabinet form weighing only 100 lbs. The launch sets are operated by friction drive direct from the fly-wheel of the launch engine. The shore stations are in charge of certificated wireless operators, but the launch sets are operated entirely by Forest officials. The Marconi Company keep an engineer in the field continuously inspecting and adjusting the sets, and although the service obtained in 1920 was a long way from being perfect this year far exceeded our expectations.

All units were closed down last winter and we re-opened them on April 1st, this year. The Marconi Company gave us the benefit of any improvements brought out in wireless telephony, and consequently the sets this year have many improvements over last year. Since re-opening in April the system has worked very smoothly. Over two thousand recorded messages have been transmitted to date and in addition to this, there has been, of course, a great amount of unrecorded business between the district office and field officers. We have found the wireless phone simply invaluable this year, and as a result of its installation on our launches and up coast points, have been able to get daily reports in every phase of Forest Service business and have received prompt and comprehensive reports on all fires. In fact, we have been able to keep in close touch all through the season with all forest officers connected with it. In previous years large fires have occurred in the territory served by the wireless, and owing to lack of adequate communications, have burned for days before we got any reliable reports regarding them. We therefore found it a great help this year to be able to communicate directly several times a day, if necessary, with officials in charge of fires in this territory.

We still have periods of poor service but wireless telephony with us has left the experimental stage far behind. We now consider it indispensible on the Coast, and plan to extend it.

Are Planted Forests Justified by Eventual Costs?

By Ellwood Wilson, Chief Forester, The Laurentide Company, Grand Mere, P.Q.

MR. WILSON'S ESTIMATE OF THE STANDING TIMBER DERIVED FROM PLANTED FORESTS.

White Spruce: $2.29 per cord.
Poplar: $1.23 per cord.
Norway Spruce: $9.50 per cord.
Jack Pine: $4.75 per cord.

These calculations take cognizance of the cost of stock, planting, administration, but do not allow for the cost of land. Note Mr. Wilson's argument as to interest charges.

"Do you know how much pulpwood is eft in the United States?" "Neither does anyone else. No one knows how soon he peak of production will be reached and production begin to decline. In this respect the pulp industry is in the embarassing position of a merchant who does not know his total assets."

The above is the opening paragraph of a most important bulletin just issued by the United States Forest Service in co-operation with the American Pulp and Paper Association, and since any discusion of the pulp and paper situation and the necessity of reforestation for Canada must take into account the situation in the United States, these words have a very vital importance for us. To summarize the timber situation in the United States briefly, New England was once self-supporting in the matter of timber, now it must import nearly all that it requires for every purpose, and its pulpwood supplies, it is said, will be exhausted in ten to fifteen years. The Middle States, especially Pennsylvania, once exported timber, now they are large importers; the Lake States once supplied the world with white pine, and now have hardly a stick left, and they have a most acute situation in regard to their cut-over lands;

the South for years has been a very large exporter and now, it is credibly believed, has only twenty years more supply at the present rate of consumption. The last great stand of virgin timber is in the Northwest, which still exports largely. Alaska is beginning to be drawn on for pulpwood. The Eastern paper and pulp mills are already drawing largely on Eastern Canada for pulpwood, over a million cords annually are now being exported, besides large quantities of pulp and paper representing very large quantities of pulpwood. The Canadian exports have risen fifty per cent in ten years and the home consumption three-hundred-and-forty per cent. The consumption of pulpwood in the United States has risen since 1890 over twelve hundred per cent. These figures go to show that the pulp and paper industry is one of basic importance and one which will continue to grow at a rapid rate. Not only must it increase with an increase in population, but also as new uses are found for its products. Not to mention the many new uses for paper such as furniture, rugs, water pipe and twine, we are just at the beginning of the age of containers of every kind made of paper, and of a large textile industry which will use pulp in ever increasing quantities. All these things will make for the stability and increasing prosperity of the industry.

Timber Holdings Enhanced.

The increase in the use of wood pulp and its products will naturally increase the price of pulp wood. Loss from forest fires and insects will also tend to diminish the supply and raise the price. As the virgin supplies near at hand are cut off, the decreasing accessibility and increasing freight rates will prove an important factor, and the increase in Government stumpage dues and ground rents will also play a minor part.

In view of all these things, freehold timber lands and limits will increase in value at a continually increasing rate, and those individuals and firms who own such lands or leases will have an asset rapidly more valuable.

Any prophecy as to the future value of pulpwood is difficult owing to the number of factors which enter into any calculation, and also our ignorance of future developments. We have, however, the experience of centuries in Europe, records being in existence dating back to 1300 and earlier. We also have the experience on this continent. It is absolutely certain that in spite of the development of substitutes, wood consumption continues to increase with population and industrial development. We have, as an example, the increase of the prices of wood in Saxony from 1850 to 1890 from $5.04 per cord to $13.95 per cord. The export price on square white pine from Canada has risen from 1850 to 1894 from 5½ cents per cubic foot to 42 cents, or approximately 18 per cent per annum. The price of pulpwood in the United States, delivered at the mill, has risen from 1899 to 1920 from $4.99 per cord to $19.03, or 282 per cent. The rise from 1915 to 1920 shows a very rapid rate, from $8.75 to $19.03. Even if we take only the rate from 1899 to 1915, the price in 19/1 will be $22. If we take only the average of the rate from 1899 to 1920, the price will be $37.50, and owing to the continually increasing rate of consumption is likely to be far higher than this.

All of which goes to show that the man who holds pulp and paper stocks might do well to think twice before he parts with them on account of a temporary set back to the readjustment after the war. Just at present many new mills have been built and the capacity of others increased, but the consumption will very rapidly catch up to them, and there is a very decided limit to the number of new mills which can be built, as cheap water power and wood are absolutely essential, and power sites are limited in number and timberlands on this continent have pretty well passed into the hands of large owners who are not likely to part with them.

Replacement Must Commence.

In the United States the question of supply of pulpwood is so acute that they are trying to force Canada to export her raw wood from Crown Lands, a policy which would be foolish and fatal to our industries. The supply in Canada is not adequate for our own needs, indefinitely, in fact we can now practically set the date when the peak of our own production will be reached, and if we will take warning from the experience of Europe and the United States, we must take steps to replace our virgin forests which will become exhausted. Practically speaking, it will take fifty years to establish new forests by planting, and an even longer period to go back to our cut-over lands for a second crop which will be less than half of the first crop if the forest is left to nature to replenish. Therefore it is high time that we decided to begin. The first question asked is what will planting cost.

The Cost of Planting.

Mr. J. K. Johnson, of the Great Southern Lumber Co., in an address delivered before the Southern Forestry Congress, said, "Usually about the first thing a hard headed lumberman will ask is, what does it cost? Well, I'll say this much, it costs all right, and one of the things we are trying to learn is how to keep the cost down to the minimum. But in the consideration of the question, through and through, I believe we will all finally have to admit that it costs too much NOT TO PRACTISE FORESTRY."

The writer believes that the time has come when, in order to maintain our industries, we **must** begin to plant trees. The longer planting is put off, the more it will cost and the longer will be the trying time between the exhaustion of our virgin supplies and the availability of planted ones. The only difficulty in determining the price of planted trees is a purely theoretical one. Shall we charge compound interest on the money spent in planting, and if so, at what rate. Most people now are charging off depletion on wood cut on timber lands, and if this amount, instead of being charged off could be spent in planting, it might somewhat reconcile those who object. The long time element in planting, the constantly increasing value of the capital invested, the sure rise in value of timber and the security of the investment, all demand a low rate of interest, and the best authorities place this rate at three to three and one-half per cent. Let us take the rate, however, at six per cent. The cost of the land does not enter into the calculation, as the land remains as an asset and will probably have increased in value by the time we are ready to cut the trees. The total cost of planting, an average from the costs of many firms who have tried it, be somewhat reduced. The cost of fire protection can be taken at ½ cent per acre, administration and taxes in Quebec at two and one-half cents per acre. Poplar will yield forty cords in twenty years, jack pine twenty-five cords in thirty-five years, Norway spruce thirty cords in fifty years, and white spruce thirty cords in forty years. This would give us a cost per cord, at the end of the above periods, of Poplar $1.23, Jack Pine $4.75, Norway Spruce $9.50, and White Spruce $5.29. It must also be borne in mind that when this timber is planted it will be in the neighbourhood of the mills, that transportation costs will be very much reduced both for the delivery of the wood and for the provisions and equipment needed in the cutting. That large wood piles would not be needed to provide for emergencies, as the wood can come directly from the stump to the mill, thus reducing the capital invested in wood piles and the insurance on them. Logging costs will be materially reduced as the stands per acre will be five times heavier, permitting concentrated operations and the employment of power saws for cutting down, and machinery for loading and hauling. Lumbering operations can continue all the year round, giving employment to permanent populations. Fire protection will be much cheaper on account of smaller areas, and the use of fire fighting apparatus and the greater interest of the people in fire protection. The mill which starts planting operations now will, at the end of its period of rotation, the time of its first cut, be in a wonderful position compared to the mills which will be bringing their supplies by barge from the north shore of the St. Lawrence 500 miles, or from the Hudson Bay region or Northern Ontario 200 or 300 miles by rail.

An Open Forum for British Columbia Problems

Hearty Public Response apparent at the Provincial Forestry Convention held at Vancouver and Victoria by the Canadian Forestry Association.

The British Columbia Forestry Convention organized by the Canadian Forestry Association was held at Vancouver on Monday, September 19th, and continued at Victoria the following day. In point of attendance, both meetings resulted most favorably. The subjects on the programme held close relation to the economic interests of British Columbia and were handled by the speakers with great fidelity and directness. Indeed each speaker took his responsibility with such seriousness as to make the papers of permanent value to all concerned in the basic problems of the natural resources, their maintenance and industrial development. In addition to the wide publicity already given in the newspapers of British Columbia, the lumber and other trade papers will use the addresses in full and special articles will be made from them and circulated through the Canadian Forestry Association to the Saturday editions of newspapers in many parts of Canada. Many of the addresses of general interest will be used in the Canadian Forestry Magazine, several appearing in this issue. Due to the substantial concession of the C.P.R. hotels, the convention rooms at the Hotel Vancouver and Empress Hotel, Victoria, were placed at the Association's disposal. Mr. C. E. E. Ussher, President of the Association was chairman at all sessions.

The Convention, it is anticipated, will have far reaching consequences as concerns the extension of the Canadian Forestry Association's influence in British Columbia. The Association, of course, in all parts of Canada is inspired solely by a desire to place at the disposal of the various provinces its facilities and experience in educational propaganda. Public service along the lines of forest conservation as well as development of tree planting on the bare prairies is the dominating reason for the Association's existence. The Association has deepened its hold upon the public confidence only by demonstrating its value in the national welfare.

As the Association's experience broadened, the original limited zone of influence has been extended until today every part of Canada is feeling the beneficial influences of its educational work, particularly in forest fire prevention. The prairie provinces are well taken care of, as concerns the promotion of tree planting, by a distinct enterprise supported by philanthropists of the middle west and the Government of Saskatchewan.

"Big stuff" as our Pacific Coast understands it.

Now arises an opportunity, and an urgent duty, to make the Association as valuable to British Columbia as it has undoubtedly been to other parts of the country. To join hands with the people and Government and forest industries of British Columbia to develop public cooperation in the prevention of forest fires and in the better understanding of other problems of forestry will be made a matter of study and negotiation within the early future.

The programme of the Convention was as follows:

VANCOUVER PROGRAMME.

MONDAY, SEPTEMBER 19th

Address of Welcome by the Mayor of Vancouver.

The Trend of the Timber Situation:
  (a) On the Pacific Coast: P. L. Lyford, Vancouver.
  (b) In the Middle West: R. D. Prettie, Superintendent of Forestry, C.P.R., Calgary.

The Outlook for the Pulp and Paper Industry in Eastern Canada:
  Paper prepared by A. L. Dawe, Secretary, Canadian Pulp and Paper Association. Read by A. E. McMaster, Secretary-Treasurer, Whalen Pulp and Paper Mills, Limited.

Lumber Export in Relation to Forest Problems:
  H. R. MacMillan, H. R. MacMillan Timber Export Co.

Industry Organization:
  W. B. W. Armstrong, Secretary, B. C. Loggers' Association.

The Motor Truck in Logging:
  F. S. Buck, Deep Cove Logging Co.

Problems of the Shingle Industries:
  Fred. H. Lamar, Secretary, Shingle Agency of B.C.

Some Phases of the Red Cedar Shingle Industry:
  C. J. Culter, Westminster Mills Co.

VICTORIA PROGRAMME.

TUESDAY, SEPTEMBER 20th.

Address of Welcome by G. R. Naden, Deputy Minister of Lands.

Manufacturing for Export:
  J. O. Cameron, Cameron Lumber Co,. Victoria.

Forest Research in the West:
  P. Z. Caverhill, Provincial Forester of B.C.

Forest Research in the East:
- T. W. Dwight, Assistant Dominion Director of Forestry. Paper read by Mr. S. R. Cameron.

Keeping British Columbia Free from Fire:
- C. S. Cowan, Assistant Provincial Forester.

Extension of Markets for Forest Products:
- Loren L. Brown, B.C. Lumber Commissioner, Toronto.

Forest Work by Aeroplane:
- Major L. A. Andrews, Regional Forester, Vancouver.

Mechanical Improvements in Fire Fighting:
- R. V. Stuart, B.C. Forest Service.

Depreciation by Forest Insects:
- Ralph Hopping, Provincial Entomologist, Vernon, B.C.

Grazing on Forest Land:
- T. P. McKenzie, Grazing Commissioner, Victoria. Paper read by G. R. Naden.

A WESTERN TRIBUTE TO THE FORESTRY CONVENTION.

From the "Western Lumberman," of Vancouver: "Addresses and paper of an extremely practical nature were presented at the two-day convention under the auspices of the Canadian Forestry Association, held at Vancouver on Sept. 19th and Victoria, Sept. 20th. While all of the subjects dealt with had an important bearing on the question of forestry in Canada, very many of them were strictly of industrial and commercial phases of the timber and lumber industry. A gratifyingly large attendance marked both days of the convention, and the very keen interest displayed was manifest throughout the sessions. The series of motion picture films depicting various phases of timber operation, etc., and the lantern slides used to illustrate some of the addresses of more technical nature, were a very great assistance to both speakers and audience in following the subjects under discussion."

Put Idle Men on Farms and Solve Depression

That an enormous stimulus would be given to the lumber and other industries throughout Canada by a carefully planned extension of the Soldier Settlement Board scheme to establish the workless men of the cities as producing farmers, was one of the most important notes struck at the Canadian Forestry Association at Vancouver, September 19th, by Mr. R. D. Prettie, Superintendent of Forestry of the Canadian Pacific Railway at Calgary. "A large part of the unemployed" said Mr. Prettie, "were born and brought up in the rural districts and from one cause and another have drifted into the cities. One cause, perhaps, is that these people never had a chance to own their farms. Would it not be better to extend to them a chance to be producers on the land, rather than to put them to work on some public undertakings of which the country is in no immediate need? The speaker said that up to May 31st last the Soldier's Settlement Board had placed 26,000 men and families on farms, the maximum loan being eight thousand dollars each with interest payments amply taking care of the public advances. The failures under this scheme to date were less than five per cent.

"The placing of twenty to thirty thousand families a year on the vacant lands of this country would cost Canada from 80 to 100 millions per annum, but it would be a first class investment. You would receive interest on the outlay, you would have an added tax paying population, and from the very start there would be a new market provided for from twenty to thirty thousand carloads of lumber as well as hundreds of cars of all classes of merchandise.

"Our country from one end to the other is overbuilt, in everything except homes and farms. Your money and my money is invested in these non-revenue and nonproductive things, or in this over capacity. There is no gainsaying the fact that what this country needs is agricultural population. Every farm consumes on the average two thousand feet of lumber per annum. What the average farm means by way of market to other lines of industry is extremely important to the internal commerce of the country. The lumber manufacturer cannot increase his production, neither can the steel and iron, cement or woollen manufacturer because there is no market for these goods at present. The only thing the world needs greatly is foodstuffs, principally grains. This is the only product for which it will pay."

Mr. Prettie demonstrated effectively how the trend of the timber industry in America was steadily and inevitably westward, due primarily to the comparative exhaustion of the virgin timber tracts. As an example, he showed that in 1850 the northeastern States produced 54 per cent of the total of American lumber, and in 1918 had fallen down to 7 per cent. During the same period, the cut on the Pacific Coast had advanced from 4 to over 25 per cent. Just thirteen years ago British Columbia produced 19 per cent of the total lumber cut in Canada, whereas today this province is responsible for 36 per cent. Within a decade, said the speaker, the centre of the Canadian lumber industry will have shifted to British Columbia.

Mr. Prettie put forward a strong argument that with the overseas market apathetic, the United States market partly blocked by a tariff wall, the obvious course for Canadian business men to pursue is to create a greater home market by the process of building up agriculture through selected immigration and the transfer of potential farmers from the workless cities to workable land.

Old Man Ryland Says:

"Some folk pays dey bills wid cash, some wid checks, and some wid reluctance."

Every reader of these lines is a Member of the Canadian Forestry Association, a subscriber to this Magazine.

Most of the members regard their annual subscription of two dollars as a pleasant obligation. They pay it promptly. They realize that the bone and sinew of the Association's field enterprises is the Membership and that there is little meaning in Membership unless a man pays the carrying costs.

Please bear in mind that the total of all membership fees just pays for the printing and paper of the Canadian Forestry Magazine. There ought to be a surplus from the fees for educational work, and the habit of "putting it off" when our accounts are rendered is the one stumbling block in the way of such a surplus.

A GOOD MANITOBA FRIEND.

From A. M. Shields, Virden, Man.—"I enclose $2.00 membership and magazine subscription for my friend Mr. Shannon. Please send him the September number.

"I am deeply interested in the great work being done by the Canadian Forestry Association and on more than one occasion have spoken and written with the view especially of persuading the farmers of this community to plant trees more and to make wind breaks, etc. With best wishes.

Keeping British Columbia Free From Fire

By C. D. Cowan, Assistant Chief Forester of British Columbia.

A Fire Patrol Boat on Harrison Lake, B.C.

Among the many tasks that the Provincial Forest Branch has to undertake, is that of fire prevention and suppression. The immensity of this work is accentuated by difficulties of transportation, communication, lack of trails and telephones, and still further, a scattered population.

In order to make the best of existing facilities and to co-ordinate them into a real organization, the problem resolves itself into two principal divisions, that of education of the public in fire prevention, and organization of all available suppression forces.

To deal with the former, I will briefly outline the programme that the Department has adopted and with, we believe, some measure of success.

At the beginning of each fire season, or to be more precise, early in April, posters are sent out outlining the Forest Fire Law, particularizing the necessity for:

(a) Obtaining permit to burn slash during the close season, May 1st to October 1st.

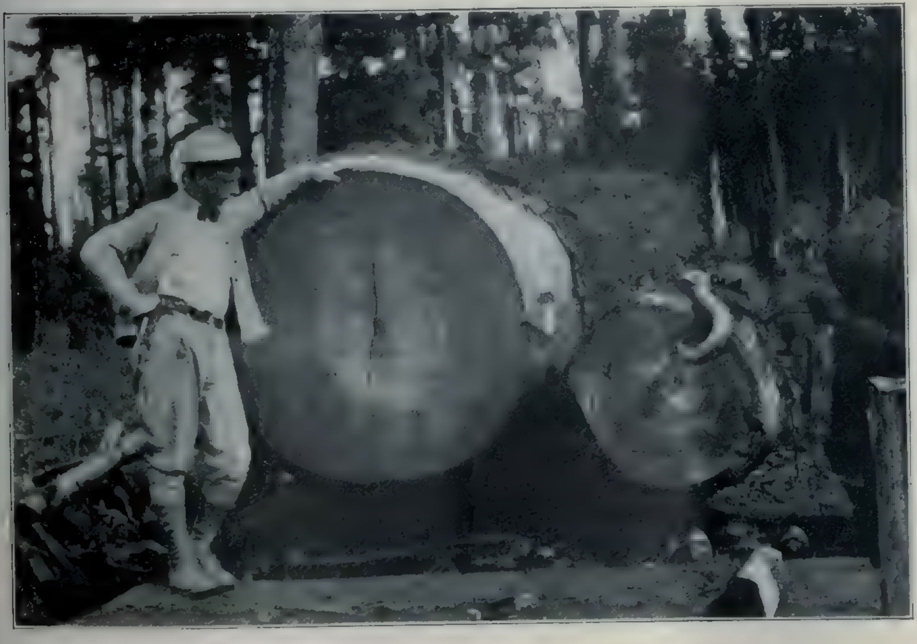
(b) The necessity for operators to be fully equipped with fire preventative and suppression appliances, before operations can continue during the close season.

(c) Warnings to campers and travellers are posted.

Railway patrols are also organized, acting in co-operation with the Board of Railway Commissioners at Ottawa. During the months of June, July and August, the newspapers throughout the Province carry the advertisements of the Department advising caution with fire in the woods.

In this regard I must voice the thanks of the Forest Branch for the way in which the press of the province has rallied to our aid, never losing an opportunity of spreading the gospel of forest protection. Such news items are not, and in the financial nature of things, cannot be paid for by the Department, but are printed by the press to carry forward a public duty which they have not been slow to recognize.

In connection with the propaganda outlined, the Department has felt that, having regard for the publicity given the forest protection during the past few years, that any breach of the fire laws must be deliberate, and prosecution follows in almost every known case of such flouting of the law, and convictions gained in practically all cases brought.



Small end of large Douglas Fir log at Ruskin, B.C.

This attitude is simply the carrying out of a definite programme, and as a general rule the person who violates the Fire Law gets but scant sympathy from the community in which he resides.

Control of Operators.

Before the fire season opens every operator in the Province is visited, and served with written notice as to whether his fire appliances conform with the regulations or not, what tools they are short of, etc.

New regulations were put into force at the beginning of the present season, regulations which entailed an additional expense to every operator, and I am very glad to say that not only were such regulations well received by the logging fraternity, but proved their worth on many occasions.

Railway patrols are also organized, rights-of-way brushed where necessary, debris burned and section crews organized for fire-fighting purposes.

Between April 1st and May 1st, the temporary six months men are appointed, and are firstly engaged on trail work, either maintenance of existing trails or cutting out new ones, repairing or constructing telephone lines, overhauling tools, and mechanical appliances and posting fire notices. After May 1st the time of these men is taken up partly on issuing Fire Permits and partly on other organization work.

This organization to which I have just referred is the realization of the value of systemizing all available fire-fighting forces, material or human.

Therefore, the Department demands that at the beginning of each season, every field officer shall prepare a list of men with their addresses who have been requested, and have consented, to act, in case of necessity as foremen, time keepers, straw bosses, gasoline men for the pumps that are used, and fire-fighters. This means that there is, at the time of a fire, no question as to pay, to duties to be performed or as to where men can be obtained.

Grocery stores are supplied with grub lists, based on the maintenance of one man for one day, so that supplies can be ordered for any number of men for any number of days, doing away with the chances of arriving at the scene of a fire camp minus salt, coffee, or some other necessary article.

Another result of this organization of suppression forces is that when men are being canvassed for fire fighting crews, the gospel of Forest Protection must, of necessity be preached, and thus we gain more converts to the cause.

Everybody's Business To-day.

But it is well known that in all cases of Forest Fires, the initial action taken to get them out is of vital importance. Thus in previous years, fires would be seen when small, but it "was the job of the Forest Ranger to put it out." In other words, it was nobody's business, which allowed the fire to reach such proportions that it became a costly business to put it out. To meet this situation, men who are selected as trustworthy and reliable citizens have been appointed Honorary Patrolmen, with supervision over territory in their immediate neighbourhood. Their job is to collect a crew immediately a smoke is reported, sending word to the nearest Forest Officer of what they are doing, and jump on the fire while it is small. During the fire season, many of our officials may be attending to fires in isolated valleys and therefore out of touch with a telephone for days at a time, so that the value of this force can be readily appreciated.

The results which have attended this organization leave little room for doubt as to its efficiency; I know personally of several cases where such prompt action has resulted in putting out fires while small, which might very easily have reached alarming proportions.

The improvement in the organization of fire suppression forces has naturally led us to improve, or to adopt improvements, in fire fighting methods.

The Department is also building up trails, tapping the timbered valleys, connecting up existing trails, establishing tool caches, burning dangerous fire hazards, seeing that debris around camps, donkeys and rights-of-way are disposed of, crews in logging camps organized, and generally doing our very best to keep Forest Protection in British Columbia a live issue, to be kept in mind not only during the danger period, but at all times of the year.

Winning the Public.

For the tourist we have built camp sites, near wood, water and shelter, we have appealed in every possible way to the public to keep the forests green, not only from an economic, but from a scenic point of view. We have shown by articles in the Press, and we have shown pictorially, the results that follow in the wake of forest fires, the dry creeks during the summer drought, the floods that follow heavy spring rains when there is no forest cover to hold the moisture back, we have shown that a depleted payroll follows fire, and therefore, we feel convinced that the method we have instituted this year, that of prosecuting every person, man, woman or child who contravenes the Fire law is the right one. In this way only will we secure 100 per cent efficiency, in this way only can we hope to convince the careless ones that we are in earnest, that we, as a forest protection organization, intend to protect our present resources, intend to secure the second crop of timber, intend to achieve our ambition, that of making every citizen of the province a forest protectionist, and keep British Columbia free from fire.

How British Columbia Penalizes the Fire Setter

The fire season, taken as a whole, has been a little below normal. The actual danger period opened late, showers being general until the end of June, when so far as concerns the three Southern Interior Districts, a hot dry spell set in, broken only by dry electrical storms. This condition obtained until the latter part of August, when a fairly general rain relieved matters considerably.

The number of fires reported to date (September 1) is 920 at a cost to the Department of $51,000 or an average cost of $55.50 per fire.

The system of appointing honorary fire wardens has worked splendidly, the staff are keen, pumps have been utilized on every occasion possible now that the full staff realize their worth, and every effort has been bent by each field officer to keep his record of fires below the quarter acre limit. The slogan adopted was no fire more than an acre or costing more than a dollar, and while we cannot live up to this as fully as we would like, yet the percentage of fires under a quarter of an acre is over 50 per cent, and of the total, possibly 75 per cent are under 0 acres.

While our reports to date are not quite complete the following summary is available:

Area burned over---- --	50,000 acres
Board feet killed (merchantable)---- -- --	4,000 M.B.M.
*Other forms of property--	$86,000.00

*This includes a $16,000 sawmill, $3,000 automobile and a $50,000.00 camp and logging equipment.

The wrong-doer has been having a thin time of it this season, the settler who thinks his fire is safe and so does'nt bother about a permit, or the most elementary precautions, finds himself before a magistrate in short order. Recently two Chinese were prosecuted for burning without a permit, and were promptly served with blue papers requesting them to appear at 2 p.m. the following day. At the designated hour, the Police Chief, the Forest Ranger and the Magistrate waited patiently till at 3 p.m. the Chinese appeared. After the charge was read the Magistrate asked the interpreter to find out why the defendants did not appear at the appointed time. Before the question could be translated, one of the Orientals revealed his idea of the comparative value of his time and the magistrates', for he replied: "Me sellee vegetable." He was found guilty.

Altogether 38 prosecutions were entered, as follows:—

Failure to equip donkey engine with fire preventive appliance-- -- --	1
Neglecting to extinguish fires---- --	1
Burning without permits-- -- -- --	27
Refusing to fight fire when called on	1
Leaving camp fires burning-- -- --	8
	38

Of these, convictions were gained in all cases.

We hope that the peak of the season is now behind us, and that the fire damage and cost will be less than 50 per cent of the cost and damage of either of the seasons 1919 and 1920.

THE "MOVABLE LOOKOUT." Courtesy American Forestry.

Mechanical Improvements in Fire Fighting

By R. V. Stuart, B.C. Forest Service.

The efficiency of forest protection forces to-day depends on the nature and adequacy of the mechanical equipment with which they are furnished, and yet it is comparatively very few years ago that the equipment used in this important public service was almost without exception, of the most primitive type. Twelve years ago the look-out was practically unknown in the North-west. Fires were detected by means of ground patrols. This meant, in a great many instances, that fires assumed large proportions before being seen. Communications as we know them to-day did not exist in Forest Protection, and when a fire was discovered, the information was usually of little value, as on account of lack or rapid communication facilities and poor transportation, it was generally out of control before help could be obtained to extinguish it. Compare this with the actual situation (not the ideal) in many forest organziations to-day. Fires are detected by means of look-out stations, in many cases supplemented by aeroplane patrols. The modern "look-out" equipped with scientific range finding instruments and up-to-date topographic maps enables the observer to locate fires with absolute precision, a distance of 25 miles or more on areas under direct observations. While with the aeroplane, fires are not only located accurately, but all necessary details regarding type of country on which fire is burning, property immediately endangered and natural fire breaks are also ascertained at the same time, thus facilitating greatly the fire fighter's task. When a fire is located, the request for help goes immediately over modern system of communications. Fire fighters and equipment, organized in advance, are quickly collected and rushed by modern methods of transportation to the scene of the fire. On arrival, if water is available, the fire is fought and completely extinguished by portable gasoline pumps, or if there is no water, is controlled with tools that are adapted as a result of considerable study and observation to the type of forest on which the fire is burning. It is no exaggeration to say that modern mechanical facilities have revolutionized forest fire suppression in recent years and have shifted the odds for successfully combating fires considerably in the fire fighter's favor.

In discussing mechanical improvements in fire fighting, it is not to my intention to refer to the improvement in mechanical facilities for detecting fires. I would like, however, to give some particulars of the mechanical improvements effected in forest protection in connection with communication, transportation and the actual job of fire suppression, with special reference to progress in British Columbia.

[Editor's note: See Mr. Stuart's article elsewhere in this issue on wireless telephones.]

The Motor Car for Fires.

In the adaptation of the automobile to forest protection work, efficiency in fire patrol and suppression have been advanced enormously in British Columbia. Previous to 1917 we were not using automobiles in forest protection beyond hirnig an occasional car for transportation of fire fighters. Land patrols were either by horse or on foot. The automobile was looked upon as something of a luxury and as such was more or less banned. In 1917 we purchased a few Ford cars, there was a marked increase in efficiency of fire patrol that year and as a result, we have increased the number each year since, until we now have between fifty and sixty cars. We use Ford Roadsters entirely. Each car is equipped with a transfer box for carrying a portable fire fighting pump and other fire fighting tools and equipment. The advantage of the automobile over other forms of transportation is so obious that it is unnecessary to enlarge upon it here. I would like, however, to give one instance of how the adoption of auto transportation has effected Fire Patrol in B.C. Taking the Fraser Valley and Island districts as an example. Forest areas in these districts are fairly accessible and well served by roads. Land clearing activity has been abnormally heavy since the close of the War. The burning permit law is in force, so that all burning between May 1st and October 1st has to be done under permit. Over three thousand permits have been applied for and issued in these two districts this year. Over 50 per cent of the areas to be burned were inspected by Forest officers before permits were issued, and in the majority of cases, a second and third inspection was made to see whether the slash had been burned and to make sure that fires were properly extinguished. The result of this close supervision has been that out of these three thousand clearing fires set out under permit, only seven escaped control. The supervision would have been impossible with the staff employed without modern transportation facilities. A few years ago the Fraser Valley was exempt from the burning permit law and one of the chief arguments against the rescinding of this exemption was that it would be impossible for forest officers to issue and supervise land clearing fires, as the job would call for an army of men.

Where Good Equipment Helps.

Thanks to the co-operation of the municipal authorities in the issuance of permits, and the fact that our men are equipped with good transportation facilities, we have succeeded in giving all the supervision necessary. Complaints from settlers are very rare, and in a district where we have had as many as fifty uncontrolled fires at one time in previous years, this year we did not have half a dozen. We have only four men in the Fraser Valley, three of whom are supplied with cars.

Before passing from the subject of transportation, I would like to describe the system we have in use in the territory West of the Cascade Range traversed by the Pacific Great Eastern Railway. This country has a very high fire hazard owing to the amount of logging and land clearing going on and owing to it being a very popular resort for tourists and campers of all descriptions. Its history, which as far as fire was concerned, was one of the worst in the Province, culminated in 1919 with a series of disastrous fires which destroyed a large railroad bridge and tied up the railroad for several weeks. Up to 1919 we had maintained patrols through this country, but they had no transportation facilities, except what they could secure from the Railway Company, and as there are no other means of travel through the country, they were extremely handicapped. In 1920 we obtained permission from the Department of Railways to operate a speeder patrol over a portion of the line, a distance of approximately 80 miles. Additional tool caches were established and a portable fire pump supplied with the result in 1920, although we had the largest number of fires on record that year, they were with very few exceptions discovered by the patrol crew whilst in incipient stages and extinguished at small cost. This year we doubled the number of speeders and added to each a trailer to carry the portable fire fighting pump, 1,000 feet of hose and sufficient fire fighting tools for twelve men crew. The increased expenditure has been more than justified. Owing to more efficient patrol, the number of fires has considerably decreased; all except one, have been extinguished without cost except labor of patrol crew and use of equipment, and the fire loss in this territory which used to run into many thousands annually, has not amounted to very little over one hundred dollars this year. The results here are to a great extent attributable to better transportation facilities.

The development of the portable gasoline fire pump has undoubtedly been the most outstanding improvement in actual fire suppression equipment up to the present. In British Columbia we have given a greet deal of time and expense to the development of a satisfactory portable pump. Most of our fires, on the coast at any rate, usually occur within reach of a plentiful water supply, and we felt that if an efficient pump could be obtained, we would be able in a normal season to not only bring our annual fire fighting bill down to the proper size, but to also reduce the annual fire loss down to a negligible figure.

We are using two types of pumps, both rotary. One driven by a two cylinder, two cycle high speed engine, the unit weighing approximately 130 lbs., and delivering about 25 gallons of water per minute against a head of 175 feet. The other operated by a single cylinder 4 H.P. heavy duty engine, and the unit weighs about 170 lbs. and delivers about 45 gallons per minute against a head of approximately 200 feet.

Either pump will do just as much work on a fire as a crew of twenty men equipped with ordinary fire fighting tools, but with this difference, the crew using the ordinary fire fighting tools as a rule are fortunate if they can control the fire, while with the pump it is completely extinguished, put dead out, beyond the danger of a come back. Anyone who has tackled the job of fighting a fire in a logging slash and has seen it brought under control after much difficulty, held for days, and then get away with the first wind that came up, will appreciate what this means.

Improving the Pumps.

We commenced using portable pumps in 1918, when we purchased one of the light high speed type. It was tried out in various districts that year with fair success, and as a result we purchased a number the following year. We needed a pump with more power, however, and in the Winter of 1919 in conjunction with a local concern, we carried out a number of experiments and as a result purchased a number of the single cylinder heavy duty type. We put these in the field last year and although they were a long way from being all that we expected, they were fairly satisfactory, and we put out a lot of fires with them. Last winter we improved them very considerably and I can safely say that this year they have to a great extent replaced the ordinary fire fighting tools on the majority of our fires. We have had a pump work on a fire nine days continuously, stopping only for change of fuel and oiling, and time and again they have saved logging equipment, logs and buildings from being wiped out.

After a fire which occurred on the lower coast in August, and which graphically illustrated the value of the pumps, originated on the edge of a slash over a thousand acres in extent. There was a wagon road up to the area and the ranger was on the scene in less than an hour after the fire started. The fire had then covered over an acre. One pump was in action in short order and soon afterwards the assistant ranger arrived on the scene with a second. With a total crew of six men, the fire was soon completely extinguished. The following day there was a high wind but no recurrence of the fire, as it had been completely extinguished.

CANADA'S LUMBER CUT BY PROVINCES AND PERCENTAGE OF CUT

Especially prepared by R. D. Prettie, Supt. of Forestry, C.P.R., Calgary.

Province.	Million of Feet.	Percentage of total Production.	Million of Feet.	Percentage of total Production.	Million of Feet.	Percentage of total Production.	Million of Feet.	Percentage of total Production.	Million of Feet.	Percentage of total Production.	Million of Feet.	Percentage of total Production.	Million of Feet.	Percentage of total Production.	Million of Feet.	Percentage of total Production.
British Columbia	647	19.3	790	20.7	1,313	29.9	1,173	30.7	669	17.4	875	25.1	1,157	29.8	1,432	36.5
New Brunswick	308	9.2	391	10.3	----	----	----	----	----	----	----	----	442	11.00	573	13.9
Ontario	1,294	38.7	1,519	39.8	1,385	31.6	1,101	28.8	1,035	26.9	894	25.6	1,110	29.1	983	23.9
Quebec	690	20.6	638	16.7	677	15.4	630	16.5	1,078	28.1	818	23.5	841	21.2	835	20.9
Total Canada	3,348	----	3,814		4,389	----	3,816	----	3,842	----	3,490	----	3,886	----	4,126	----

100,000 Canadian Citizens Visit our Exhibit Car This Year

By G. Gerald Blyth.

Readers of the Forestry Magazine have followed the progress of the Forestry Exhibit Car of the Canadian Forestry Association, and many of the Eastern members have visited the car in person and have witnessed for themselves the enthusiasm manifested by the large crowds at the various towns at which the car stopped.

The new car, 15 feet longer than the one used last year, was loaned by the Canadian National Railways and fitted up in April at Ottawa for the 1921 tour. A portable moving picture machine with a splendid collection of films on lumbering, outdoor life and forest fire protection formed a very important part of the equipment and a moving picture demonstration together with a short talk on fire protection and the importance of our timber as a national asset was given each evening.

During the period in which the car has been "on the road," namely from May 4th to date of writing, September 14th, 105 lectures were delivered and considerably over 100,000 persons passed through the car.

In the larger centres, through the courtesy and co-operation of theatre owners, large audiences of school children, often aggregating 1,200 to 1,800, were treated to a moving picture demonstration on forest protection, after having visited the car.

Among some of the notable persons who paid the car a visit during the season were His Excellency the Governor General, His Honor, the Lieut.-Governor of the Province of Quebec, the Rt. Hon. Arthur Meighen, the Acting Premier of New Brunswick, the Ministers of Agriculture and Education for Ontario, and many members of the House of Commons and the Provincial Legislatures.

The association is endeavouring particularly to interest the youth of this country in the preservation of our forests. Through the medium of the Exhibit Car we have been able to reach thousands of young Canadians whose business it will be in the near future to shoulder the burdens of state, to direct our National policy and handle the natural resources of this Dominion. The Canadian Forestry Association believes that to educate the rising generation to the value and importance of our forest wealth is to take a great step forward in its future protection both from fire and waste.

The car has not only travelled the main lines has been run up branch lines to many remote places; it has even travelled over logging railroads and lectures have been given to the men of the bush, at the sawmill and in the camp, even in their own bunk-houses. The car is so well equipped electrically that storage batteries and the picture machine can be removed, and a successful picture show can be given away from and entirely independent of the Exhibit Car when the occasion demands.

THEN GENTLY SCAN.

By Douglas Malloch, the Lumberman Poet.

We none of us are perfect—none
Has seen a day entirely sun;
Across each pathway shadows fall,
There is some good and bad in all—
"Then gently scan your fellowman"
And judge him kindly as you can.

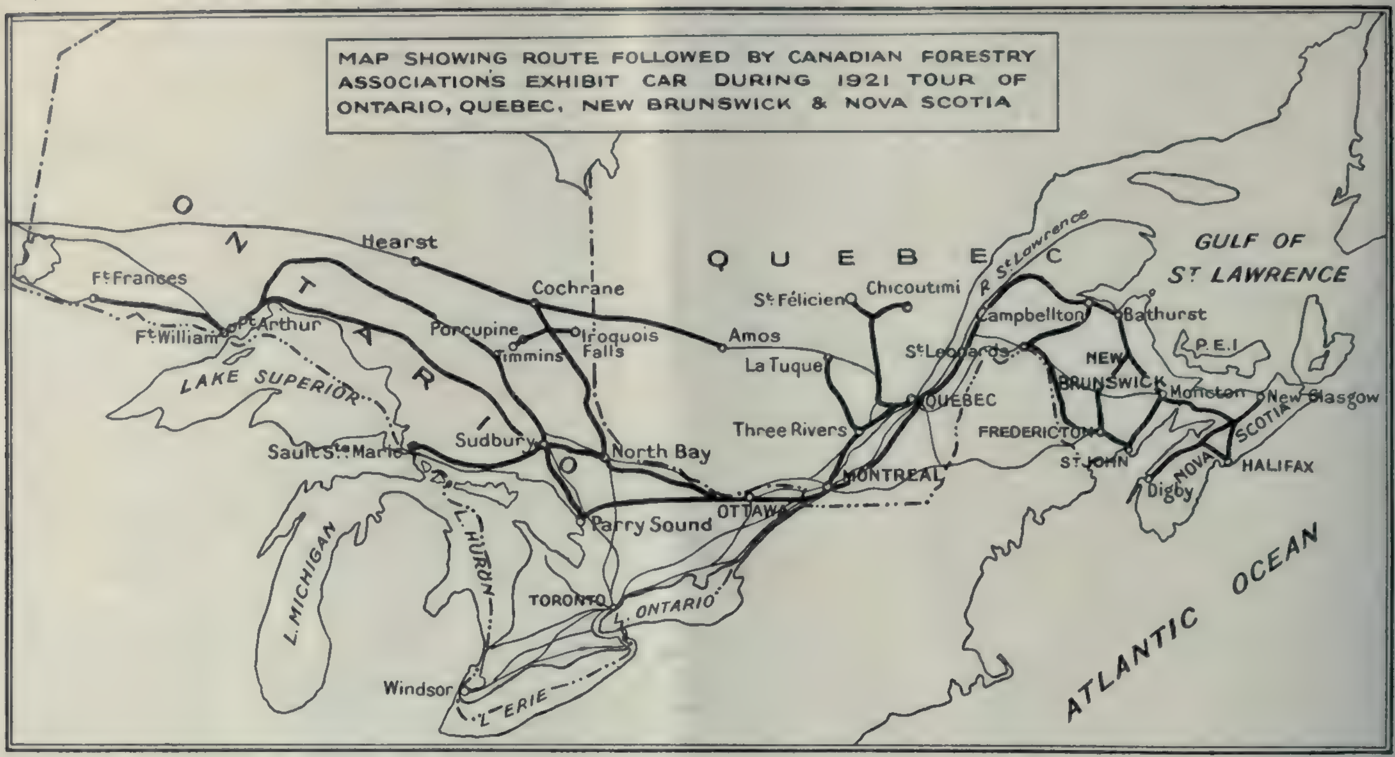
We none of us are always wise—
Some cloud will cross the bluest skies,
Some error oftentimes will find
A lodgement in the wisest mind—
It is the errors of our youth
That give to the store of truth.

We are not always pleasant—we
Have storms as well as hill or sea,
When anger's blackest thunders roll
Across the apex of the soul—
In such an hour in other men
Let us wait the sun again.

We none of us are perfect—in
The judging of another's sin,
Another's error, saint or fool,
There is but one impartial rule—
Let us demand no more, yea less,
Of good than we ourselves possess.

We none of us are perfect. Then
The greatest brotherhood of men
Is in forgiveness, charity—
Ourselves is other men to see,
And in ourselves to recognize
The fool as quickly as the wise.

The Canadian Forestry Association's Exhibit Car taken to a lumber camp near Pakesley, Ontario. Such an unexpected visitor (over a logging railway) was given a royal recention.



Prepared in H.R.I Branch

The above map outlines in heavy black the railway lines in Ontario, Quebec, New Brunswick and Nova Scotia, along which the Canadian Forestry Association's Fortes Exhibits Car "a forest protection school on wheels," has travelled in the 1921 season. It is hoped to send the Exhibits Car with the Association's Lecture Car attached into the territory south of the St. Lawrence before November.

The Forest Exhibits Car has visited at the time of going to press (October 1st) 92 comunities and has been responsible for 101 evening lectures on forest protection. It has covered 7,052 miles, the Canadian Pacific and Canadian National railways granting free haulage everywhere.

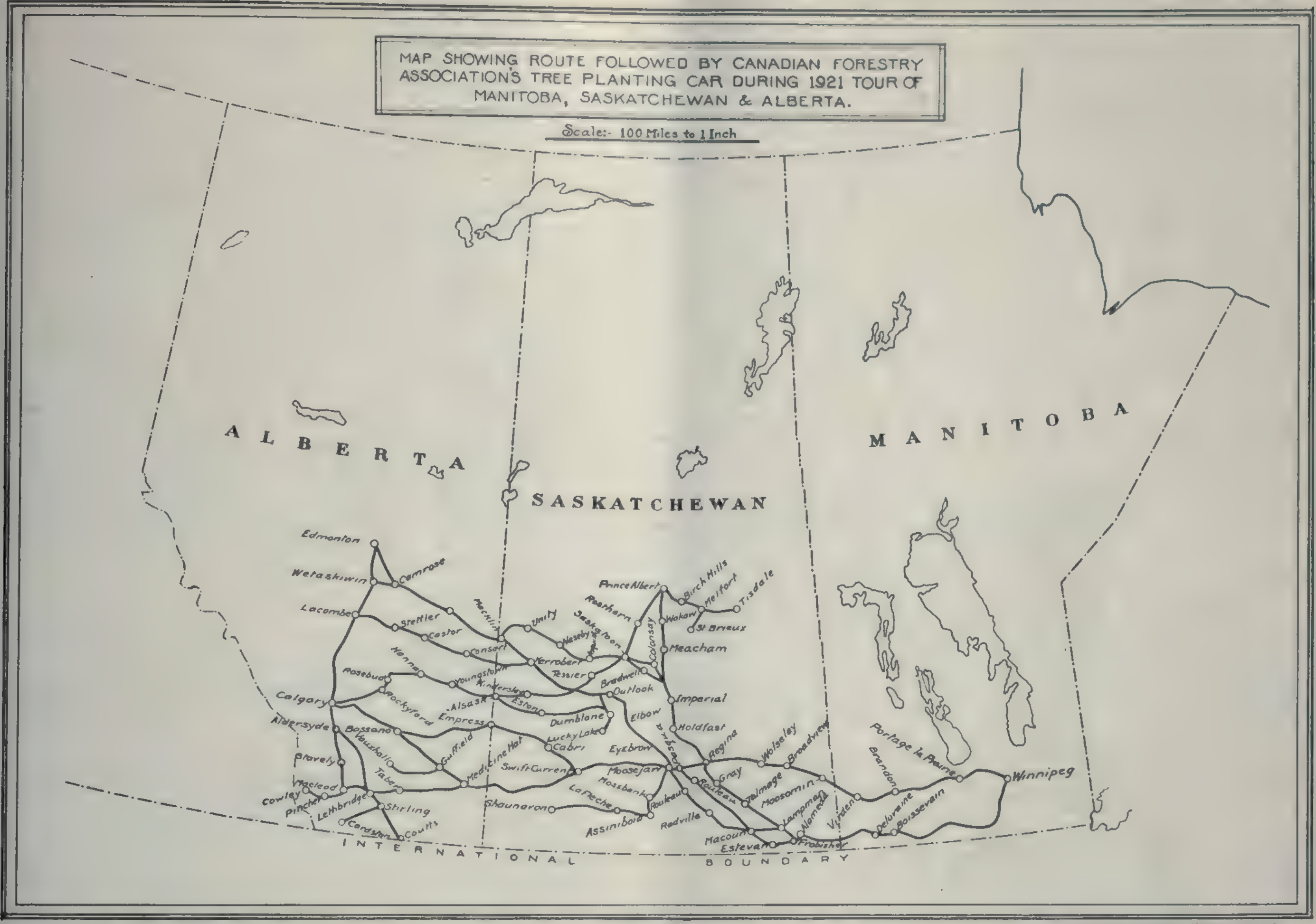
More than 100,000 people have visited the exhibits between May 6th and October 1st. From the novel and instructive nature of the objects, and the forcefulness of the arguments for forest fire prevention, it is not too much to say that every person, big and little, carried home some intelligent idea of the value of Canada's forests. From many parts of Eastern Canada have come valued testimonials as to the real educational effect of the Forest Exhibits Car. The tour this season was in charge of Mr. Gerald Blyth, Assistant Secretary of the Association and English- and French-speaking helpers.

A Message From the President of the Canadian Pacific Railway

The following letter was received on October 7th by the Secretary of the Canadian Forestry Association from Mr. E. W. Beatty, President of the Canadian Pacific Railway Co.:—

"It is a matter of great gratification to all of us that the work of your Association is being carried on with such conspicuous success and I heartily congratulate you and your associates."

A view of British Columbia Coastal timber, Cedar, Hemlock and Douglas Fir.



Drawn in Dominion Parks Branch

With Our Tree Planting Car in Western Canada

Almost fifty thousand persons have visited the Tree Planting Car of the Canadian Forestry Association during this season's tour of the Prairie Provinces, and at least half a hundred thousand citizens of the West have learned why it pays to plant trees on the bleak, wind-swept prairies. Through the energy of the Association's western lecturer, Mr. Archibald Mitchell, ably assisted by Mr. Angus Cooch, hundreds of farmers and settlers have been visited at their own farms or homesteads and their tree planting problems dealt with on the spot. Scores of municipalities which have approached our Western Lecturer concerning the layout of prospective parks or boulevards have been supplied with working plans, with detailed advice as to species of trees to plant, and complete instructions for planting and maintenance, absolutely free of cost.

Many of the visitors to the car came skeptical and unbelieving, feeling it was useless, unprofitable, and even impossible to successfully grow trees under their peculiar local conditions, and that nature never had intended the prairies to be anything but a bleak barren expanse devoid of the comforts and beauty afforded by the presence of trees. Few if any of these "doubting Thomases" ever went away doubting.

The interest shown by school children everywhere is remarkable. In addition to the daily lectures there are, of course, movies, real tree planting pictures showing areas before and after planting; how to plant, etc. This, as can easily be imagined, proves in many instances a unique attraction for the children. And after all it is the children we most want to get. Their young minds are plastic and it is not necessary to knock out old and hard-set conceptions first to make room for the more rational ideas.

Fortune smiled on the Association this season through the courtesy of the Saskatchewan Government in attaching the Tree Planting Car to the "Better Farming Train" which that government sent out. During the period that the car was attached to this train an attendance of 32,774 was recorded. More rapid progress was naturally made under this arrangement as the train attracted huge crowds at every stop.

The tree planting policy adopted by the Canadian Forestry Association is intended to bring practical assistance and inspiration to the prairie farmer o stimulate a love for trees in the youthful element of Western Canada: It is a "labour of love" to our western representatives and is a service of inestimable account viewed from the national standpoint.

The Canadian Forestry Association now has over four thousand members in Manitoba, Saskatchewan and Alberta, but the number should be at least ten times that. Plans are now under way to secure a heavy membership growth throughout the West as soon as election fever subsides.

A CORRECTION.

Through a typographical error the third paragraph from the last in the article entitled, "A Tree Three Million Years Old," published in the September issue, was rendered meaningless. This paragraph should have read:—

"Canadians will no doubt eventually see to it that these great Cretaceous archives with their intensely interesting records are set aside as a national park. At present there is not even a map available by which the tourist can find his way into them."

"Pacific Coast Lumberman" on British Columbia Forestry Convention

"As Mr. Ussher, president of the Canadian Forestry Association, and Mr. Robson Black, the Secretary, sped eastward at the conclusion of the recent convention, carrying with them the hearty thanks of all who had attended the gathering they had originated, one can imagine them exclaiming in unison, "Well, we have started something in British Columbia any way, and that is the first of a series of important forestry conventions of their own."

"For the most noticeable thing in the proceedings of the convention was its direct concern with problems mainly affecting this province. Held as it was in the two centres of the B.C. lumbering industry, its attendance was chiefly British Columbian and, with two exceptions, the programme was made up of items dealing for the greater part, with B.C. conditions contributed by experts whose interests, scientific or commercial, are quite dependant upon the conservation of the lumber resources of this province. Many individual papers were given, the value of which alone may be almost said to have justified the gathering. The contributions made to our knowledge of up-to-date fire protection methods, of the progress of scientific research and incidentally the crying need for further facilities in this connection, were of surpassing interest. Not less important than the subject of the conservation of our timber were the addresses dealing with the marketing of the manufactured lumber. On one subject all the speakers agreed. Invariably in the course of their remarks did they refer to the excellent work that the Canadian Forestry Association is carrying on both in the matter of providing valuable data to the members of the industry itself, and in the education of the general public to the realization of the extreme importance of their mighty heritage, the forests of the Dominion."

THE B.C. FORESTRY CONVENTION.

(Excerpt from Pacific Coast Lumberman.)

"The result was a highly successful and most instructive gathering, and on all sides hopes were expressed that this will be the first of many such conventions to be arranged by the Forestry Association, the value of whose services to the lumber industry of the Dominion in creating a sound public opinion upon forestry problems cannot be overestimated."

"EXPRESSES MY VIEWS PERFECTLY"

From Mrs. W. T. Hayhurst, R.R. No. 2,
Armstrong, B.C.:

Enclosed please find $2.00 for a renewal subscription and membership in the Canadian Forestry Association for the coming year.

Also names of people whom I know to be lovers of trees and nature generally.

The Forestry Magazine itself expresses my views most perfectly.

Yours sincerely in the Forestry cause.

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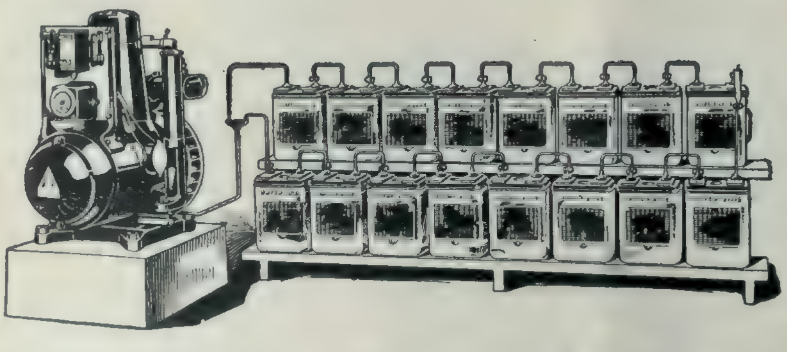

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THE COMPLETE ELECTRIC LIGHT AND POWER PLANT

At a minimum of trouble and expense Delco Light gives a maximum of Service and Safety. Write for free information.

The plant illustrated above is identical with that used on the 1921 Tour of the Canadian Forestry Association's Eastern Exhibit Car.

ELECTRICAL SYSTEMS LIMITED
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AEROPLANE FOR SALE.

"FOR SALE—Curtis JN-4, registered, perfect flying condition, fitted with sea floats and land undercarriage. Flown 30 minutes since overhauled. Delivery ex Chicoutimi Air Harbor. Price $1,200.00, or best offer. Apply Aviation Dept., Price Bros. Co., Ltd., Chicoutimi, P.Q."

Serving Two Nations in One Day.

One of the odd experiences of the Canadian Forestry Association's Tree Planting Car in the prairie province this year was encountered at Coutts, Alberta. This town lies directly alongside the United States boundary, the American municipality adjoining being called Yellowgrass. When the Tree Planting Car arrived for its daily lectures, the only siding available lay half in the United States and the remainder in Canada. Curiously enough, the school authorities of Yellowgrass, confident of the hospitality of the Canadian Forestry Association, brought their school children to a special lecture and a little later the Canadian children from Coutts also assembled. At the conclusion of the lectures, the odd spectacle presented itself of Mr. Mitchell, the Association's lecturer, carrying on discussion with American citizens at one end of the car, resting on American soil, while Mr. Cooch, his assistant was engaged at the other end of the car with Canadian citizens on Canadian soil. Surely the Tree Planting Car that day was acting as the international "bridge of understanding" to which the orators so frequently refer.

MONARCH TRACTORS

Dependable - Economical and Easy to Operate

Absolute dependability makes the Monarch Tractor particularly suited to work in the lumber woods where expert mechanics and spare parts are usually many miles distant.

For instance, the manganese steel chain belt treads on which the Monarch "creeps" show so little wear that they are guaranteed unconditionally for the life of the tractor.

These chain treads—like those used on the huge war tanks—enable the Monarch to travel on any surface. It lays its own track as it goes.

It pulls heavy loads over deep snow and ice, through bogs or sandy ground, for it gets sure footing on any surface.

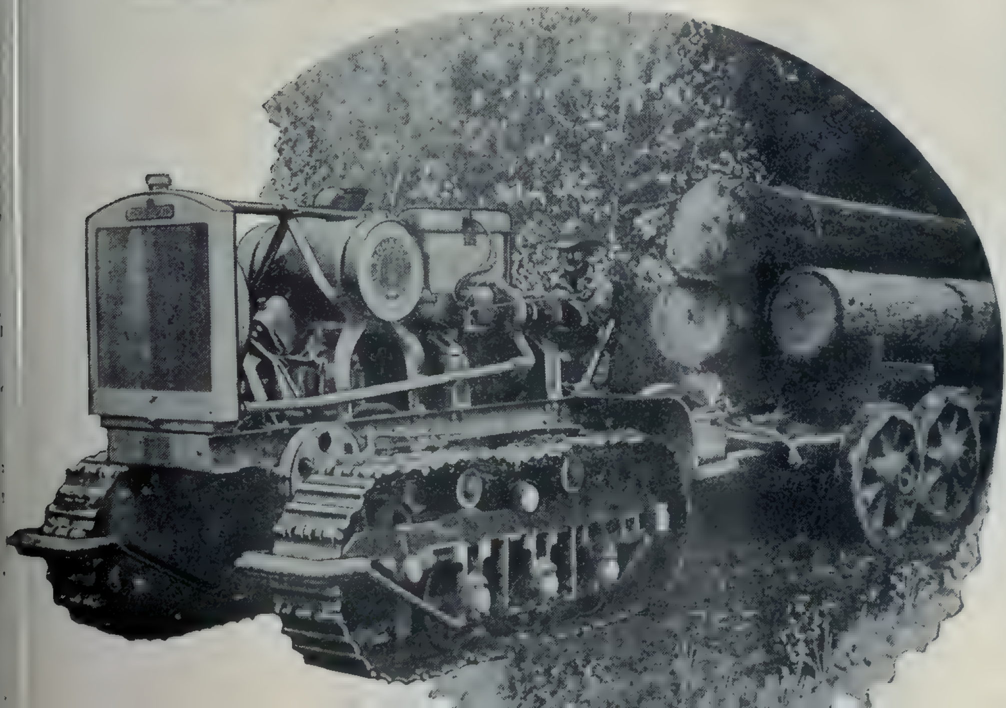
Ability to turn in its own length enables it to take the sharp curves in forest roads with ease.

It is easy to operate, and economical, too, for its fuel is coal oil.

In addition, the Monarch supplies winch power for snaking, and belt power for any purpose for which an engine may be required.

Write for Catalogue

Monarch Tractors Limited, Brantford, Ont.



NEW BRUNSWICK'S EXPERIENCE WITH FIRES.

Fredericton, N.B., August 27, 1921.—Weather statistics recorded by the Federal stations in New Brunswick show the present fire season to have been the driest for over half a century. Periods of from six to twenty-five days occurred without any rainfall, not even showers with the precipitation from 30 per cent to 70 per cent below the average for the various stations during the months of May, June and July. This condition coupled with drying winds and extremely hot weather not only dried out the field crops but made conditions in the forest the most hazardous for fires on record, and rendered fire fighting very difficult on account of the lack of water in the swamps and brooks and the very dry condition of the soil.

Statistics for the fire season have not been completely compiled at the time of writing, and may reveal some changes upon closer investigation. About 300 fires have been reported, of which 200 required extra crews of men to extinguish. About 60,000 acres were burned over, 80 per cent of which was previously burned over land. Forty per cent of the area burned was privately owned land. The cost of extinguishing is in excess of previous years. The most serious day of the year was on August 6th when a very heavy windstorm swept across the southern part of the province, rendering the control of fires very difficult. Several residences at the summer resort of Westfield were burned as well as five houses at the village of Gagetown.

Causes of Fires.

Fishermen, campers, picnic parties and others in the woods were the cause of about fifty per cent of the fires. Railways caused twenty per cent, settlers fourteen per cent, while thirteen per cent are charged to miscellaneous causes. Lightning has for the first time in the experience of the Department caused serious fires, three per cent being attributed to this cause due no doubt to the extremely dry weather and thunder storms, not followed by heavy rains. The very dry condition of the woods accounts to some extent for the large number of fires charged to camps as it was found that in several cases fires spread from campers fires where the party had used precaution and put water on their fires.

Standing timber Escapes.

Apart from the loss of property at Westfield and Gagetown the damage to standing timber has been very small this year. Complete statistics are yet not available regarding the amount of timber burned. The damage caused from the different sources of fires is not in the same proportion as the causes. Settlers' fires caused practically no damage this year, while the damage from railways is also small. The restriction placed on all slash burning on

May 20th, which prohibited the using of fire permits, accounts for the reduction in the number of fires and damage caused from settlers' fires.

Fall burning of slash is being agitated throughout the province. Of the total number of fires, over half were extinguished before spreading over five acres. Over 1,000 temporary fire wardens were on the lookout for fire during the dry periods. The lookouts rendered valuable service in forest fire detection and the hearty co-operation of all the lumbermen in supplying equipment at the fires was of considerable aid in quickly organizing fire fighting crews. The co-operative wardensof the licensees and private land owners have rendered valuable service.

Forest fires may only be reduced by eliminating the causes. As stated above, the restriction on slash burning has practically reduced the danger from slash fires and the precautions taken by the railways in keeping their locomotives in condition and patrolling the right of way has materially reduced the railway fires. Fishermen and campers fires must be controlled, and in view of the comparatively large damage and large number of fires attributed to this cause, the Department now has under consideration prohibiting fishermen and others from entering the forest in the dry season without a permit from the forest ranger.

The Tractor for Logging Lumbering and Hauling

JT TRACTOR HAULING LOAD OF 24 TONS AT 20° BELOW ZERO.

The JT is dimensioned for its ability to go ahead where there is no road—under trees and between them—its traction is sure in the underbrush, on solid, swampy or sandy ground—its control is sensitive and positive—it can be handled to the fraction of an inch in narrow passages.

It will snake logs when teams are out of the question.

The JT will turn in a radius of 6 ft., its width over all is 60 inches, and it has a caterpillar traction of 1,628 sq. inches.

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NORTH BAY, MONCTON.

THE TREE PLANTING PLAN FOR CHILDREN.

The Canadian Forestry Association's plan to interest the boys and girls of Canada in tree planting through a national essay competition (as announced) has aroused the enthusiasm of our members and has given the undertaking an auspicious baptism. Arrangements are proceeding by which the educational departments of the various governments will give their co-operation and the help of all newspapers will be available in getting the children aroused. Some of the comments sent in by Association members are given herewith:

"An excellent plan. Should have far reaching and beneficial results."—B. F. Avery, Sault Ste. Marie, Ont.

"Get the local representative, or the teachers to tell the children what the trees mean and do."—B. F. Griggs, Winnipeg, Man.

"Come over into—Nova Scotia—and help us."—David L. Whitby, Truro, N.S.

"Interest is already being awakened. Keep up the effort by all means. Your plan is good."—George Ashdown, Winnipeg, Man.

"A splendid idea. The essay should apply by all means to the writer's home territory."—Jos. A. Wright, Winnipeg, Man.

"An excellent idea."—Dr. E. R. Proctor, Whitby, Ont.

"We should do all we could about the two lines."—Jos. Miljour, Fugerville, P.Q.

"I feel if an opportunity is given the boys and I will include the girls too, that they will not only become interested, but will show practical results. From my experience, I find the large majority of boys will act upon instruction where practical results can be attained."—F. W. Hall, Perth, Ont.

"It is the children of today we have to depend on for our forest reserve."—Geo. E. Hymers, Hymers, Ont.

"For many years I have been a strong advocate of this work."—Geo. Durnford, Montreal, P.Q.

"Very important to have the 'young idea' in this matter."—George C. Wells, Montreal, P.Q.

"I think your plan a good one."—E. Pugsley, Kitchener, Ont.

"An amateur photo competition might also stimulate interest."—G. A. Gamsby, Summerberry, Sask.

"Laying a rational foundation."—Dr. Robert MacKenzie, Vancouver, B.C.

DEATH OF HON. W. C. EDWARDS.

Through the passing of the Hon. Senator William C. Edwards, of Ottawa, in his seventy-eighth year, a veteran figure in the lumber Industry, the Canadian Forestry Association has lost one of its outstanding Directors and Past Presidents. The late Senator took a veiy active interest in the affairs of the Association and in 1910 was made Vice-President. Through the absence of the President at the Convention held in Fredericton in 1910, Senator Edwards was called upon to preside. Next year he very ably presided over the bi-lingual convention held in the Quebec Legislative Assembly which was opened by the late Earl Grey, Governor General of Canada .

The late Senator took a very deep interest in public matters that affected the welfare and prosperity of Canada and was chairman of the Committee on Forests of the Conservation Commission. For several years he sat in the House of Commons as a member for Russell County, and in 1903 was summoned to the Senate.

Frequently during a period of failing health and with his time plentifully occupied by business affairs, Senator Edwards set aside personal considerations to serve the Canadian Forestry Association's interests. In more than one emergency his influence tipped the scale in the Association's favor.

Senator Edwards is survived by his wife and several brothers and sisters. Gordon C. Edwards, a Director of the Canadian Forestry Association, who for many years has been prominently associated with W. C. Edwards & Co., is a nephew.

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Forest Fires and Canada's Fur Trade

By Wm. MacMillan (of Holt, Renfrew & Co.)

Seldom does the casual observer or even the interested individual for that matter, ever see those two highly important subjects discussed together.

Much has been said and more has been written of the vast areas of timber lands, falling prey to the flames. Far easier to reduce that resultant loss of lumber, into dollars and cents, than to estimate with the faintest degree of accuracy the pecuniary loss in so far as the fur bearers are concerned.

That forest fires destroy wild life is unquestioned—but to what extent is a somewhat debatable question. Endowed with keen brains and active bodies, most of the wild folk, it would appear, scurry before the onrush of the flames—on occasion leaving their young to fight as best they may.

To the experienced man of the woods, the action of certain wild creatures follows certain clearly defined lines, for instance, during a fire of any consequence, such peculiarly gifted animals as the Beaver and the Rat, plunge to the bottom of the nearest stream or lake, and being root-eaters, have no difficulty in finding sufficient nourishment. The Mink or Otter too, seek protection in the cool waters of a nearby stream and there find usually enough Muskrat and fish to guarantee them against hunger.

But these other non-water animals, the Moose, Caribou, Bear, Lynx, Fisher, Marten, Bear, etc., flee before the crackling flames to distant hunting grounds and seldom return to their former haunts till the second or third summer has attempted to clothe the burnt out section with an under carpet of green. Thus the game is pushed to the farther extremes of civilization and the trapper must needs hunt on more extended lines with its attendant increase in cost and hardship.

The fur business today stands with our forests, among the most powerful of the real assets of our future.

Just as the cry of the world is for our particular timber so the type of furs that men and women of the old and new worlds desire, has to be had in our wonderful Canadian forests, and only by the immediate enactment of wise legislation will our forests and fur bearers be conserved for the profit of the coming generations of Canadians.

MODERN FOREST FIRE FIGHTING.

Great as has been the advance in fire fighting methods and equipment in towns and cities in Canada in the last five years, the advance in fighting forest fires has been even greater. Dominion, provincial, and private forest organizations are now using airplanes, power launches, railway speeders, automobile trucks, and portable gasoline pumps, besides the old reliable horses, spades, hoes, and wet sacks, in their protective work, and are calling men out to danger points by means of telephones, heliographs, and others signalling apparatus.

The Arctic Eiderdown Robe Is a White Man's Bed

THE value of an Arctic Eiderdown Robe can only be appreciated by actual use. Mr. C. A. Hazen has voluntarily written us regarding his experiences and upon solicitation consented to allow us to publish the accompanying extract from his letter.

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"While editor of Forest and Stream" I accumulated a collection of sleeping apparatus difficult to duplicate. Woollen blankets led the list, but they gave way to rabbit skin blankets made by the "Tete Boule" Squaws, a real skin, carribou-lined sleeping bag, the work of Northern Labrador Eskimo and others.

The rabbit skin blanket developed a colony of "cooties," the sealskin bag became a wet and evil smelling abomination, and the wool blankets were the ordinary weighty nuisance. Then I became the owner of anArctic Eiderdown Robe and found it a revelation of lightness, warmth and comfort; because I could crawl into it at night discarding tent or fire, and sleep as warmly and soundly as in my bed at home. I am writing this in a real spirit of gratitude and appreciation, hoping that others belonging to the shivery clan, that claims me in full tribe membership, will profit thereby. It is a white man's bed, regardless of how many minus degrees the thermometer marks. How you get so many "Calories" into it I don't know, but the important part is you do, and that is enough.

Yours very truly C. A. HAZEN.

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Idle Acres Can be Set to Work.

"An idle acre is as much an economic waste as an idle working man and the nation needs work today."

With this appeal the American Paper and Pulp Association is sending to its membership a review of the work of its Forestry Committee in advance of the coming Fall Business Conference at Chicago, October 31 to November 4. After telling of the actual extensive reforestation work being done by paper manufacturers, particularly in the East, the Association reviews the whole subject of forestry by saying:

"The paper industry is an active participant in the campaign to restock 81,000,000 acres of idle forest land. The wood from so large an area is more than will be needed b ythe paper industry, even though the acres now idle become productive. The nation needs work today not only by the human element in industry, but the other elements entering into industry and business. It is inconceivable that this progressive and agressive country of ours can allow 81,000,000 acres of land to loaf while the product procurable from this land is needed. The Shell-McCormick bill now in Congress will be given a full and free hearing by Congressional Committees, probably in January.

"The last six months has seen national recognition given to the paper industry for its leadership in the campaign for forestry legislation. While the paper industry uses less than 4 per cent of the total lumber cut of the country, there is good reason to anticipate that before another year national legislation will have been enacted, founded on the principle of federal co-operation with the States and private owners, without federal control of private operations."

The foresters of the paper industry will discuss practical forestry at the meeting of the Woodlands Section during the fall Conference week at Chicago, their session being set for Wednesday, November 2. Twenty sectional meetings will be held during the week, with the main meeting of the American Paper and Pulp Association, Thursday, November 3.

A FORESTRY BOOKLET FOR THE ASKING.

Through the kindness of the Canadian Pulp and Paper Association we are able to offer our readers free copies of a highly important and most interesting brochure entitled, "Forestry Conditions in Sweden, Finland, Norway, Great Britain and France," written by Mr. Edward Beck, who as representative of the above Association spent the summer of 1921 in those countries investigating forest conditions.

The contents of the publication deal not so much with the theories of sylviculture but with the part played by the State and by the private owners of timberlands in the maintenance and renewal of the forest resources. No series of papers could have a more practical and stimulating influence upon forest management in Canada.

By all means write for a copy to the Canadian Pulp and Paper Association, Drummond Building, Montreal. It will repay perusal many times over and will be retained as a permanent reference.

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TESTING CANADIAN WOODS.

The announcement has recently been made that the Board of Works for the United Kingdom has added certai Canadian timbers to the list of those used by the department. That the qualities of Canadian woods might be understood and the timbers thereby put to the best possible use was the object of the Minister of the Interior, Canada, in establishing the Forest Products Laboratories in connection with the Forestry Branch. The laboratories are making mechanical and physical tests of Canadian woods and the results are published from time to time as the investigation of each species or group is completed. The information obtained is proving of great value not only to timber users in Great Britain and other countries, but also to Canadian engineers, architects and builders. Beginning with the more important species the investigation is to proceed until all woods having any commercial value are tested. Bulletins 59 and 60, the two so far issued on this subject, may be had free upon application to the Director of Forestry, Ottawa.

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A CANADIAN OBSERVER IN FINLAND.

By Edward Beck.

HELSINGFORS, Finland. — Finland, perhaps more than Sweden, is dependent upon her forest resources. As in Sweden, the people appreciate the importance of maintaining and increasing these resources, although this realization, as interpreted into practical usage and protective legislation, dates back less than a quarter of a century. Before that time Finnish forests were largely allowed to take care of themselves.

During the last twenty-five years laws, based upon those of Sweden, have been enacted and are now rigidly enforced. State and private owners of forests cooperate together in building up and maintaining the forests and in employing means for their perpetuation.

The practice of reforestation on a broad scale is carried on almost universally, except in the more northerly parts of the country where there is still much wild land. Finnish forest methods, however, are generally based upon the theory that it is better to let nature do the work where possible and to use artificial means only where necessary, and most of the cutting is done with that end in view. Some fine examples of natural forests from 60 to 80 years old are to be seen.

Here, as in Sweden, the private owners put their forestry and logging operations under a single supervision and management. The chief forester directs how and what trees shall be cut, always with the object of impairing the growing forests as little as possible, and following the cutting operations when necessary with replanting. Most of the companies buy timber in addition to cutting their own. They maintain separate organizations to deal with bought timber but the same requirements as to replanting is made to apply.

The extent of the forest organizations built up and maintained by the companies may be illustrated by that of the Kymmene Aktiebolag, one of Finland's largest pulp and paper companies, which owns over 600,000 acres of forest lands scattered over a wide area. This company employs a chief forester, nine district chiefs, 100 foremen and the necessary laborers, all of whom devote their entire time to forest operations. The chief forester and the district chiefs are well paid and are each provided with a home which is also the forest headquarters for the district. All the chiefs are trained foresters, and have been through the technical schools established for that purpose. This company has also accomplished what few state or private owners have succeeded in having made a complete survey of their forests and learning to a certainty the amount of available timber, the annual growth and all other details. By means of this survey they have been enabled to map out their forest program for years in advance.

Finland's total area comprises approximately 144,250 sq. miles, of which about 17,000 square miles, or 11.75 per cent of inland waters. More than one-half of the land area is made up of forests. There are about 75,000 square miles which produce merchantable timber, of which about 58,000 square miles are classed as highly productive. About one-third of Finland's land area lies north of the Arctic circle and includes most of the less productive forests.

Owners Must Replant.

In Finland the State owns about 38 per cent of all the land, including 20,000 square miles of productive forests. (There are private companies in Canada which control a considerably larger forest area). Private companies own a greater proportion of the best forests, their holdings approximately 58,000 square miles. The State sells the standing timber on its holdings by methods similar to Sweden's and makes adequate provision for its replacement. Private owners are restricted as to the uses of their forests and are not allowed to cut in any manner that is considered injurious to future development. When they cut the land clean, as they sometimes do, they are obliged to replant it.

Selective cutting is generally practiced, the trees being taken out with due regard to the effect produced on those left standing. Drainage is resorted to for the purpose of increasing production, and thinning is carried out in a scientific manner at necessary intervals. Fire hazards have been reduced to a minimum and the fire losses, compared with those in Canada, are practically negligible.

Pine and spruce form the basis of most of the forests, with an admixture of birch and other hardwood species. No authentic survey of the timber resources of Finland is available, although there are several estimates which are held to be reliable. One, made by Col. Gosta Serlachius, president of the Finska Cellulosaforcumigen, places the timber resources of the country at approximately 31,000,000,000 cubic feet (335,000,000 cords). Calculations made on the assumption of an annual growth of 1.5 per cent, which has been shown to be below the actual, indicates a yearly yield for the entire country of 5,650,000 cords.

Finland's present timber requirements for all purposes, domestic and industrial, are drawn chiefly from a territory which includes rather less than three-fourths of the total forest area of the country. This territory, however, represents a considerably larger part of the actual timber resources. It is estimated that from 20 to 25 per cent of the total standing timber of the country may be classed as merchantable material of sawlog dimensions.

In normal years Finland exports about 300,000,000 cubic feet of timber and sawn lumber. (There are approximately 375 sawmills in Finland, many of which, however, are of very limited capacity). The wood pulp industry produces 220,000 tons of mechanical and 350,000 tons of chemical pulp a year, using up about 900,000 cords of wood in the process. The consumption of timber for domestic requirements, including industrial and railway fuel. (All locomotives here burn wood) has been estimated at 5,000,000 cords a year, much of which is hardwood, principally birch.

These figures indicate on the surface that Finland is using every year an amount of wood equal to or exceeding the estimated annual growth, although in reality, especially when active reforesta-

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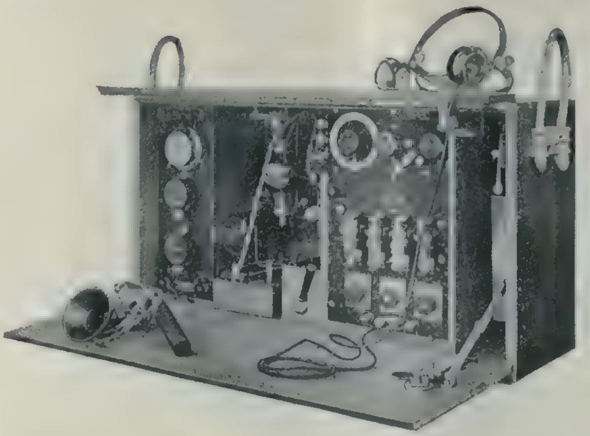
tion is taken into account, the annual increment is considerably greater. It has been estimated that the forest resources of Finland are sufficeint to insure a supply of pulpwood for requirements based upon the present rate of consumption for 145 years, without taking into account the new forests that are growing up in the meantime.

Progressive State Policy.

During recent years the Finnish government has increased its forest holdings by purchases from private owners, a policy adopted with a view to restoring the productivity of lands exhausted by reckless cutting in the past and of raising the general standard of economic forestry in the country. The most desirable areas of accessible timber lands in Finland are now well taken up and there is apparently little prospect for industrial companies to increase their holdings by purchasing additional lands from the State. During the unsettled conditions of the past few years there have been many transfers of land among private and corporate owners, with the result that several of the stronger industrial companies have greatly improved their position in this respect. Today, however, the State is doing its utmost to prevent agricultural lands from being bought up by the companies and reverting to forests.

Forest practice and lumbering methods in general while showing marked improvement in the last fifteen years are still said to fall somewhat short of the high stage of development reached in Sweden. State supervision and control, as already noted, have been responsible for great improve-



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ment in forestry practice and the increasing value of timber has gradually forced a higher standard of efficiency in lumbering methods and the utilization of timber for industrial purposes. In some remote districts there is said to be still much waste of timber by reason of careless lumbering and from fires and other sources, but these are in a fair way of being eliminated.

Timber and water powers constitute Finland's chief national asset, and the lumber, pulp and paper industries are and must continue to be the foundation of the entire economic life of the country. The The present population of Finland does not exceed 3,500,000. Although 55 per cent of the people are classes as dependent on agriculture, the country as a whole is not self-sustaining as to food. Many peasant farmers engage in lumbering during the winter season and the sale of timber from small peasant holdings constitutes an important part of the annual cut of timber. The growth of present importance of the timber industry is of prime importance to the national welfare. The fact that the Government and the people as a whole fully realize this is shown by the manner in which the forests are now being maintained as well as by the steps that are being taken to ensure their future.

A Business Barometer

Mr. James W. Sewall, forest engineer and timber cruiser, with offices at Washington, D.C., Old Town, Maine, and Sanford, Florida, states that hitherto the intensity of demand for services such as he offers, has fluctuated with the rise and fall of business in the lumber and pulpwood circles. For a period of years back he has felt acutely the rising activity or waning strength of the lumber market, and as a rule the demands or lack of demands for his services have preceded slightly the general apparent trend, just as stock market prices are apt to discount futures. With these past facts in mind he feels reasonably optimistic as to the comparatively near future, as quite a quickened call for estimates and working plans is making itself felt, in distinct comparison with the period commencing early last autumn and lasting thru most of the winter, when new orders were scarce and the Sewall crews were kept busy mainly on work already started.

Mr. Sewall has about 50 men in the field with work going on as far south as Florida and as far north as Quebec, as well as in various parts of New England, New York and Pennsylvania.

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LUMBER OF ALL KINDS

LETTERS TO THE EDITOR.
The Canadian Forestry Magazine assumes no responsibility for, and does not necessarily endorse, the opinions expressed by correspondents.

PLANTING SEED FOR REFORESTING.

The question of Reforestation in Ontario is one that has received the attention and study of a great many of our leading citizens. Considering the extent of the lands of North Western Ontario that are suitable for growing timber, but not suitable for agricultural purposes, and considering further the vast stretches of these lands that have been burnt over and laid waste by fire within the last twenty years, the question of reproducing a forest, of merchantable timber is certainly one of the most pressing questions that could occupy the attention of our Government. The plan for reforestation adopted in most European countries, is replanting, although some of the countries have adopted seeding. In Ontario, considering the great extent of the burnt over lands that need attention in this respect, the question of re-planting, if it is expected to reclaim even a very small portion of the waste land, is out of the question on account of its cost and the difficulty of getting sufficient labor to re-claim anything but a very small percentage of the lands laid waste every year.

After having studied this question for many years and I lived more or less in this country and in the pine forests for forty years, I have come to the following conclusions:

That re-seeding is the only practicable way in which even a small portion of these lands can be brought under the growth of **pine trees,** but in order to re-seed, the ground must be prepared in some way for the reception of the seed. Just after a fire, and before the annual plants have covered the ground with their growth and debris, seeds sown will grow and produce a forest every time, but when some years have elapsed after a fire has swept over a section of country, the pine seed not being able to get to the soil, will not grow, as pollen from the poplar, Balm, and other trees will drift with the wind for miles, the land is soon overgrown with these almost useless forest trees. After a fire, where the soil has been made bare, it is an easy matter to re-seed. There are about 4,500 pine seeds to the pound, and one pound will pretty well seed an acre of ground, and after a fire, where the soil is exposed, three men would sow several acres per day, but where the vegetable growth of weeds and other refuse has covered the ground, the soil would have to be prepared, but in every part of the burnt over districts there are patches that would only require to have the soil disturbed with a hoe or rake, and in this way smaller patches of trees could be produced that in time would re-seed the larger areas. To figure out the cost of re-seeding, I may say that a number of years ago, when I was in the Ontario House I brought a proposition before the Department, to provide 100 pounds of White Pine seed which I agreed to have sown, under my own supervision, in different parts of Western Ontario to prove that this theory was practicable. At that time I was a member of the American Forestry Association and much in correspondence with Mr. Gifford Pinchot, who was then Chief Forester of the United States, and he offered me one hundred pounds of white pine seed for $3.75 per pound, at Washington. My little scheme fell through as I could not interest the Government sufficiently in it to induce them to get the seed for me. I understood at that time that an abundance of seed could be obtained at all times for $4 to $5 per pound. In connection with this I might say that all the forests that have yielded all the pine timber and lumber on this continent were produced

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by natural re-seeding, which is very much more uncertain than would be artificial seeding, for the reason that white and red pine trees seed only about every five years and if the fire which cleared the soil occurred before a seed year the ground would not be in proper condition to receive the seed and there would be no result therefrom. All the pine forests have been produced when fires ran over the ground on a seed year, or one year before, but from the above you can see this was a slow and uncertain way of reproducing a forest.

In addition to the above, I might suggest that all fire rangers be instructed, in seed years, to use mattocks or hoes and prepare patches of ground under the large trees that would be loaded with seed. Then you would have natural reforestation with the aid of artificial preparation of the ground. This would be the cheapest way of reproducing the forests but as many of the areas are now covered with poplar and jack pine trees that have attained a considerable growth, it would be quite a laborious job to clear any very great spaces around the big pine trees that have remained after the fires, and that could in this way be utilized for reseeding, but small patches of ground could be found near all seed trees that could be prepared in this way and the result would be in every case a good crop of pine. Also, the fire rangers could be instructed, and for this purpose their numbers augmented. During the months of September and October they could be provided with seed and instructed to prepare the ground in patches and sow the seed. This would be a cheap way of getting numerous patches over large sections reforested every year. In addition to this, every fire ranger will have noted that in thousands of places a few small pines that have germinated are struggling to get their top out to the sun, but are being smothered by the more worthless forest growths that spring up more quickly, and grow much faster in the start. By carrying an axe the fire rangers could cut down a tree or a few bushes that are smothering a pine and give it a chance to get its crown out to the sun, after which it would be able to hold its own. Trees saved in this way would in time become seed trees and while the forest, in this way, would come back very slowly, it would certainly, at a minimum cost, materially help the bringing back of the pine forests.

White and Red Pine trees will not grow and flourish in a shade—they must have their tops out to the sun. The writer has had occasion, at various times, to study the condition of our natural forests, how they produced, etc., etc., and to give a case in point: A forest on Muskeg River was examined. The soil was white clay, with clay loam on surface; the land was generally dry and rolling. On this section on twenty or thirty square miles there was a dense ninety-year old forest of Poplar, Balm, Birch, White Spruce, Jack Pine, Balsam, and in low places Black Spruce and Cedar. The height of this forest was about eighty feet, and scattered through it there were a few very large white pine trees, 4 or 5 to the acre. These towered 70 to 90 feet above the under forest, and were about 250 years old. Now the examination proved, **first,** that the area was originally covered by a forest of white pine; **second,** that the forest was about 150 years old, when the fire that destroyed it occurred; **third,** that it was a fall fire (August or September); for the ground must have been exceedingly dry and the forest floor littered with inflammable material; **fourth,** a considerable number of the trees were not killed—their tops being so far from the heat that they were not scorched. **Fifth,** it not being a seed year for Pine, the ground

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was seeded with other varieties of trees, and when a pine seed year occurred the seed could not get to the soil; and there was therefore no secondary forest of pine; hardly a secondary pine tree in the whole area—examined—with one exception. One of the large pines had been struck with lightning when the second forest was about 40 or 50 years old; this fire had burnt over about one or two acres, and as this had occurred on a pine seed year the result was a dense growth of pine covering the burnt over area. Otherwise, in all that section, there was no evidence that a secondary growth of pine had been produced, nowithstanding the fact that thousands of large pine trees had been showering their seed on the ground for over one hundred years.

W. A. PRESTON.

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W.A.P.

SHADE TREE REPAIRS.

(Concluded from page 424.)

comparatively dry. It is not permanent, however, and if used on a surface slow to cover, should be applied yearly until the wound heals.

An application of thick coal-tar makes a more satisfactory covering than paint, and sometimes one application is sufficient. It must be kept under observation, however, and if there is any indication of cracking or peeling, a fresh coat should be added. If desired, the disinfecting and water-proofing may be done in one operation by first mixing the creosote and coal-tar in the proportions of one-fourth creosote to three-fourths tar.

Asphalt has in recent years come into considerable use as a protective covering since it is less likely to crack and peel than coal-tar. To be used the asphalt must be mixed with some solvent, such as creosote, gasoline or other mineral oil. The asphalt is first melted over a fire and then removed before stirring in the oil to avoid the chance of it catching fire. Sufficient of the solvent must be used so that the mixture will be somewhat thicker than paint when cool. It is best to prepare a small trial mixture and allow it to cool to air temperature before making up a large quantity. Ashphalt without solvent is sometimes used, but it is necessary to apply it hot. It should therefore be used only where the heat will not injure the living tissue of the tree, as on the interior surface of large cavities. Apply hot asphalt with a cloth swab.

Grafting-wax in liquid form is good for coating small surfaces but it is too expensive for use on large wounds. It may be made by melting ordinary grafting-wax and stirring in half the quantity by weight of alcohol. Or it may be made by melting one pound of white resin with one ounce of beef tallow and after removing from the fire, adding eight ounces of alcohol. It should be kept corked.

FROM THE GRAIN GROWERS !

Here is a typical opinion of the Canadian Forestry Association. It comes from the United Grain Growers, Winnipeg.

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The Aeroplane's Service to Forestry

(Concluded from page 419)

Object Detection.

The principal object of the patrol trips was, of course, to be detection of fires and the round trip taking upwards of three hours covering over 300 miles. Figuring an average visibility of 20 miles meant the actual covering of around 3½ million acres, or about 20 per cent of the whole district and including that portion where due to weather and risk, past experience shows the fire hazard is greatest. The Sunday patrol trip was considered to be particularly desirable, in that over the week end all camps are closed down and thousands of tourists and city folk are scattered in outlying points on pleasure trips. The hazard curve in consequence goes up and on account of the closing down of the rural telephone and telegraph, quick detection and reporting is hampered.

A Plan for Fire Fighting.

In addition to the regular patrol, allotment was made available of a portion of the flying time for emergency trips for fire fighting. The big F-3 machine was to be used for this work and a set of fire fighting tools with a portable gasoline fire pump were gotten ready to stand by, and a picked crew of fire fighters organized in advance. These arrangements were made to enable us to try out the aeroplane for actual fire fighting work for the transportation of a small picked crew as occasion arose to some fire, which was so located as to be hard of access by other means, for instance at the head of one of the long inlets on the mainland or high up on the mountains where no roads or trails existed but which could be reached with a plane landing on the inland lake. In the past, thousands of dollars have been spent cutting trails and fighting a way into a fire before any actual fire fighting was possible. One particular case occurred last year where over a thousand dollars were spent cutting a trail into a fire before any fire fighting could be started and where, if a plane had been available, five or six men with a pump could have landed on a small lake within 2 miles of the fire a few hours after discovery, and the fire fought and brought under control when still small. Fortunately or unfortunately no favorable opportunity presented itself this season to try this out in actual practice.

A trained Forest Officer accompanied each patrol trip so that in case of discovery of a fire, communication and transportation of the ground staff could be co-ordinated to best advantage after detection.

Supervision of Fires.

A portion of the time allotted to Forest Protection was held in reserve for special trips of supervising officials. In fighting forest fires, particularly in the height of the season, conditions sometimes arise where a ranger has to detail assistants and at times temporary employees to take charge of fires. This happens when a number of fires break out simultaneously. In such cases the expenditure of considerable sums of money and the handling of serious situation may be under direct control of untried men. At such times it is of untold value to be able to transport a fire protection expert to the scene of a number of fires so that he may size up the situation, reduce or increase the fire fighting staff and advise on plans of attack. Lack of judgment on the part of men in actual charge of fires is often very costly, as untried foremen have it in their power, should they lose their head at critical moments, to waste considerable sums of money before an experienced officer can get on the job. One such case might mean the saving of sufficient money to pay for a good deal of flying.

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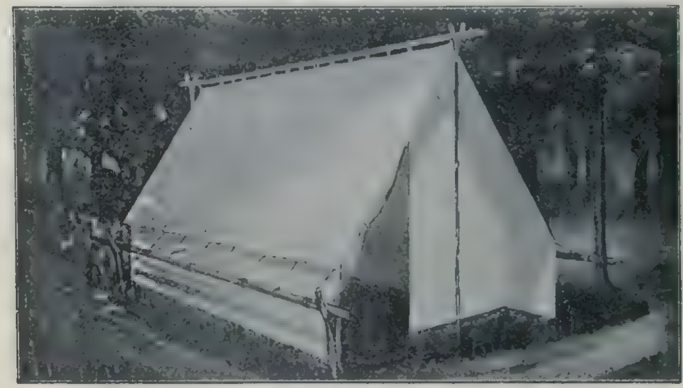

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Administration.

Plans were laid as well for utilizing a portion of the flying time available for experiment in general administration work.

One trip of inspection and supervision was planned to cover the whole district once a month so that the chief executive or his second in command could keep in immediate touch with field conditions in outlying sections where no other means of transportation was possible. A certain amount of time was also allotted for special trips and for experimental work, amounting in all to about ten hours flying.

Research Work.

After Fire Protection, one of the chief functions of the branch is that of research. Investigations are being carried on to determine what is actually coming on in the way of a new crop of timber on cut over lands, also the rate of growth which is occurring in these stands of reproduction and young timber in order to establish the relationship to our present rate and expected rate of exploitations and a future supply. Stock taking to find what we have actually got in the way of capital stock of timber is another phase and the use of aeroplanes was planned to a limited extent to assist in the research work being undertaken.

Twenty-five per cent (25%) of the available flying time was, therefore, allotted to reconnoissance work and for the mapping of cut-over and wind-blown timber and spotting of areas of young growth for the ground crew employed on investigation work. A definite photographic survey of an uncharted section of the Upper Powell River was also planned in lieu of an arduous and expensive ground reconnoisance which would be otherwise necessary.

Difficulties of Mountain Flying.

The past season has not been ideal for flying generally speaking. During the fine weather in June, July and August, fleecy clouds were encountered almost daily at high altitudes when cruising any distance inland or near the higher ranges. This year being the first that any extensive operations were carried out on this coast, conditions new to the experience of pilots who were used to flying in the East and Overseas, were encountered. Mountain flying on this coast is coupled with weather and air conditions found nowhere else and naturally many features of the work presented problems to be solved. Straight flying for transportation purposes is simple work in any temperate climate anywhere except for fog. There was no difficulty on this score but for photography, air movements, cloud conditions and light conditions in mountainous districts presented new problems to be solved. The visibility has been exceptionally good this year due to the absence of drifting smoke and haze during the hot season. Not for many years had the air been so free from haze as this year throughout the whole province. In the main no serious difficulties were encountered which would tend to prevent successful operations.

Results this Year.

A total of 64 flights were made this season in the interests of the Forest work. The total time in air for these flights was 95 hours, 35 minutes. The total miles flown was over 8,500 miles, which figured at a mean visibility of twenty miles, ten miles on each side of this line of flight, would mean a total area covered of 100,000 square miles of country.

Twenty-eight flights were made on Forest Protection work.

Fourteen flights on Administration and fourteen flights on Research.

Aeroplanes covered 5,000 miles on fire patrol and fire supervision.

Twenty- one new fires were located on twelve of the patrol trips. On the remaining 16 trips no new fires were spotted and conditions were reported safe.

One trip of inspection was made after the last rain in June with the object of making sure that all fires resulting from the burning of logging slash were actually out. On each trip the majority of known

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fires were inspected as to progress in .. ng and officers in charge of the fire were taken up to examine the lay of the ground. The result of one of these trips was that 75 per cent of the fire fighting crew were immediately taken off the fire here as it was determined that natural barriers surrounding the fire rendered it unlikely to do further damage.

Three fires on Vancouver Island were discovered one Sunday and as a result crews were put to work that day and fires reported safe next day. As all commercial telephone and telegraph were closed down that day and as the fires were in out of the way locations, it is doubtful if they would have been discovered and reported until they had at least another day's start, which would have meant heavy extra expense.

At Theodosia Arm a fire was discovered by the Patrol which on account of being in a very out of the way place would probably not have been discovered until after it had assumed large size. It was completely extinguished the following day.

Recurrences of the Menzies Bay and Half Moon Bay fires were discovered in time to be checked. The ground patrol in the immediate vicinity had not seen them.

Assistant District Forester Stuart in charge of Fire Protection says, **"The Flying done this Season has effectively demonstrated the value of aircraft for fire patrol on this Coast when handled properly."**

Administration Flights.

Four trips of inspection and supervision were made by supervising officials of the District office. A good number of the field staff were visited on these occasions and matters of importance taken up and disposed of which had to be handled in person. A closer touch was established with the field than was ever possible before or could be accomplished by any other means.

Three trips of inspection were made by Victoria head office officials and a thorough inspection was made of mechanical equipment in the field as well as the operation of the Launch Repair Station and wireless telephone shore stations. The value of this in raising the general tone of work in the organization is incalculable. The effect of personal supervision of a superintendent in a factory is generally recognized in its effect on the organization. In no less degree is its effect felt in the Department's organization, but the difficulties attending such supervision where the organization is spread over such a large area are a hundred times greater, which indicates the peculiar value of the aeroplane in our work. One trip of inspection might be described briefly. The party including the Chief Forester, District Forest and Assistant Supervisor of Scalers left Vancouver one morning about 10 o'clock. The plane landed at Thurston

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Bay at noon, a distance of 120 miles, when the District Supervisor and a number of the Rangers were met by appointment. After lunch the party proceeded to Drury Inlet, a further distance of 100 miles, where two logging operations were inspected and two field officers consulted on an important matter. After a two hour stop the party flew to Quatsino on the other side of Vancouver Island almost at the extreme north end. Some business of importance was transacted and local officials interviewed and a return flight made to Alert Bay where the party spent the night. Total miles flown for the day—400 miles. Notes were made on the trip over a strip of country which was badly damaged by a windstorm some years ago. The next morning the party left Alert Bay and lunched at Thurston Bay, making an inspection of the Repair Station and Hydro Electric plant. The return trip was made to Vancouver that afternoon. Total distance covered 600 miles, total time flown, 9 hours in two days. The time required to make this trip by ordinary means of travel would be not under two weeks.

Estimating Damage.

The first undertaking this year of reconnaissance work by aeroplane was a survey of the damage caused to Vancouver Island and Mainland timber by the great wind storm of January 29th, 1921.

Thirty hours flying was done on this work and practically the whole of the five million acres of timberland affected were covered. Results of this reconnoissance were checked up in two of the areas most affected by a party of cruisers on the ground, and the aeroplane reports found to be approximately correct. Omissions occurred on the first few trips due to the inexperience of the observer, but in the end a very comprehensive survey of the situation as a whole was obtained. It was found that first reports of the damage were greatly exaggerated. It was found that on the whole five million acres affected carrying a total stand of timber in the neighborhood of one hundred billion feet, less than one quarter of one per cent of this stand had been damaged on the whole, and the total loss suffered was not over 200 million feet of timber. This will, of course, be in excess of the average annual depreciation due to windfall but as a part will be salvaged, is not excessively alarming. To have covered this area by ordinary methods would have taken months and would have cost thousands of dollars.

A similar undertaking was carried out on the Olympic Peninsula about the same time. Aeroplane reconnoissance there showed a vastly greater damage done, according to a U.S. F.S. report. A total of twenty-three and a half hours flying was done on the wind-damaged area in Washington. The total area covered was 2,200 square miles. Three hundred and fifty-four photographs were taken and an estimate made of the damage done. The total figures obtained as a result of this reconnoissance was that approximately six billion three hundred million feet of timber had ben blown down, which would approximate about three times the total yearly cut of the whole of this Province.

During the season on a number of the flights, lumbermen and other business men were taken along as passengers where space permitted. I think the general conclusions arrived at by Department officials are backed up by the majority of those men who have seen for themselves.

It is my personal opinion that the aeroplane in Forest Work has proved its usefulness along certain definite lines. It is my opinion also that past results justify further experiment along certain lines and full support and encouragement for the development of exact technical work such as extensive surveys and reconnoissance.

For quick transportation to enable inspection and supervision in any business whose interests are scattered over a wide territory where commercial lines of transportation are not developed, the aeroplane has proven that it is reliable, efficient and economical.

For quick transportation in emergency where loss of time is costly and liable to be disastrous, the aeroplane has no rival.

Given time locomotion by air is coming as came the steam locomotive and the automobile, nothing can stop it. This might as well be recognized first as last. It only requires development and the backing of public opinion. Forest work will be one of its useful fields. The solution of the Forest Fire problem in the country depends to a large extent on the development of mechanical appliances for fire suppression, the portable pump, etc. Prevention is the best cure brought about by public recognition and public backing for the conservation of a great exhaustable natural resource.

Experience with Tree Seed on Our Prairies

Doopmore, Manitoba, June 16th, 1921.

The Editor "Canadian Forestry
Magazine":

I read with interest Mr. Otto Schicobeck's article in the April number. Here in Western Canada conifers were badly injured during the winter of 1919-20. Some people were of the opinion that this injury was caused by a blight disease, but it is my opinion that the main cause of injury was the lack of hardiness in the trees affected, and I think the following notes on the behaviour of some of my conifers will bear out my contention.

Abies balsamea, grown from commercial seed secured in the United States and probably collected in the east, only one specimen came through uninjured, four others were badly injured but grew from the terminal shoot; the balance were cut to the snowline and in some cases outright.

Abies sebirica, seed secured from Johannes Rafr, collected in the Urals; the largest specimens were about 20 inches high and were uninjured though one of them was growing within three feet of a specimen of A. balsamea which was killed outright.

Abies concolor, from Colorado seed: this beautiful conifer kills to the snowline with me every winter; it showed no more injury than usual.

Picea alba, of unknown origin, quite uninjured.

Picea nigra, native, also uninjured.

Picea excelsa, from commercial European seed: a small percentage of these proved hardy and are now from six to ten feet high; these came through uninjured.

Picea excelsa septenoinalis, from Finnish seed, a large proportion of this form proved hardy and though some of them had the terminal growth injured the majority started from the terminal bud.

Picea oborata, Siberian seed: these were about two feet high and showed no sign of injury. This is a very promising spruce and is now making growths of over eighteen inches annually.

P. pungens, commercial seed from U.S.A., said to be collected in Colorado: practically all of these showed a certain amount of injury, more especially those which had just the previous year's growth above the snow; most injury occurred near the snow line and extending from 6 inches to a foot above and below that line.

Pinus flexilus, commercial seed collected in Colorado; these were about 2 feet high and only one came through uninjured, the balance had their leaders destroyed.

P. Banksiana, commercial seed from U.S.A., these were from three to five feet high; only one came through uninjured, the balance were killed to snowline.

P. Sylvestoris, commercial seed bought in Canada, these were from six to twenty feet high; some of these were killed outright while others were more or less injured; several have started into growth again after losing practically all their leaves.

P. Sylvestris, this form came through quite a bit better than the former and a number of specimens were uninjured.

It will be seen from the foregoing that even native conifers, when grown from seed which has probably been collected in Eastern Canada or the Eastern States can not be relied on with us here but at the present time it is impossible to secure seeds of native conifers which have been collected in the West, the demand at present is too small to make the collection of these seeds a paying proposition.

The Forestry Department does collect a certain amount of conifer seeds, but only for its own use.

It is more than likely that a number of interesting trees of North Eastern Asia such as the White Oak, Basswood, and Elm of Mongolia, the Manchurian Maple, Ash, Cork tree, and Pear (Pyrus ussienienses) would also prove hardy and valuable trees here provided we could secure seeds from the colder parts of their native habitat.

My experience with the latter of these trees may prove of interest, quite a number of years ago, I secured seeds of Pyrus ussierenses from Johannes Rafn, and raised several hundred seedlings, most of these were killed the first winter, while the balance were completely destroyed the second winter. During the autumn of 1918 I secured scions of P. ussurienses from the Arnold Arboretum and now have a fine grafted tree which at the time of writing is over five feet high and gives every promise of being thoroughly hardy. I also have a hybrid of this pear with one of the European pears (Hansen's No. 18) which is very promising; this tree was slightly injured by sunscald during the winter of 1919-20 but came through the past winter absolutely without injury.

F. L. SKINNER.

KEEP FORESTS GREEN.

If Canada's forests are kept green the result will benefit our lumbermen, farmers, manufacturers, merchants, railways, ship owners, and, above all, our workingmen. If the forests are destroyed this destruction will leave much of the land a barren desert. It will dry up our streams and injure every person in Canada, no matter what his business.

FALL SEED CATALOGUE READY.

Our readers will be interested to learn that the Fall, 1921, catalogue of Messrs. Kenneth McDonald & Sons, Ottawa, Ont., is off the press and ready for distribution. The seed annual for 1921 is also available and is a beautifully illustrated book which should be of interest to gardeners and horticulturists throughout the country. We understand that both these publications can be had for the asking.

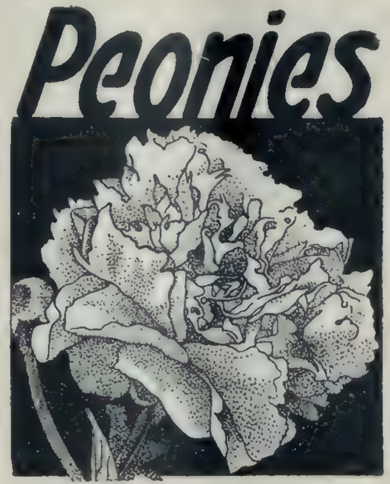
Two Even-aged Stands in New Brunswick

W. M. Robertson, Forester, Dominion Forestry Branch.

A comparative resumé of the growing conditions found on two stands of timber, the one following the Great Miramichi fire 95 years ago, the other on lands burned over 35 years ago may be of interest and value in assisting to determine the most profitable age at which to cut such stands.

The Miramichi fire burned over 6,000 square miles of timber lands in 1825. Growth studies show that nature promptly set to repair the damage and a new crop of spruce, balsam, pine and cedar, birch, poplar and maple started within a few years. The new crop was evidently a full one, indeed so full that almost no reproduction started after the first decade.

Within this area numerous patches of several square miles each, lying along the



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Nipisiguit river, were burned over a second time between 30 and 40 years ago. On them nature came to the rescue again, producing another crop of spruce, balsam and pine, birch and poplar within one decade. Thus are found, side by side on the same type, two even-aged stands, one 85 to 95 years old, the other 25 to 35 years old.

For each of these areas representative stand tables and growth studies have been obtained. The old or first stand was cut to an 8-inch diameter limit in 1920 yielding, from 139 trees, 1,025 cubic feet or 11.4 cords per acre. The largest number of stumps in a single diameter class was 31 of 9 inches (8 inches D.B.H.). There were less than 16 in any class above 9 inches. More than 75 per cent by numbers or 58 per cent by volume of the cut was less than 9 inches D.B.H. The spruce now standing are: 95 free trees, and 43 suppressed trees, having a total volume of 342 cubic feet or 3.9 cords.

The following table shows the composition of the two stands immediately previous to the cut:

	Spruce.		Balsam.		Pine.		Poplar.		P. Birch		Others.		Total.
	No.	p.c.	No.	p.c.	No.	p.c.	No.	p.c.	No.	p.c.	No.	p.c.	
First Stand -- -- -- -- -- -- --	363	54	29	4	--	--	74	11	167	25	31	6	664
Second Stand -- -- -- -- -- -- --	158	24	176	27	37	6	151	23	134	20	--	--	656

In the first stand 38 per cent of the spruce, 12 per cent of the balsam, 30 per cent of the poplar and 8 per cent of the birch were dead. The number of dead trees that had decayed beyond recognition can only be surmised. They would probably be at least half as many more.

In stand number two, however, there was no mortality except in the poplar of which 12 per cent was in a dying condition. This mortality economy in the younger stand should not be overlooked.

The shortage of balsam in the first stand is very probably due to an attack of spruce budworm which swept the area some thirty years ago.

The two stands were about equal from the point of numbers and reproduction conditions. In the first stand the largest number of trees was found in the 6-inch diameter class in every species except poplar, which culminated in the 8-inch class. The 2-inch and 3-inch classes were almost absent since the stand was even-aged without recent reproduction. A similar condition obtains on the second stand where the culminating diameter classes are balsam 1-inch, spruce 2-inch, pine 3-inch and birch and poplar 5-inch.

When Growth Occurred.

Growth studies reveal that 75 per cent of diameter growth occurred on stand No. 1 during the first 50 pears, after which accretion was remarkably slow. It required 25 years on the average, to produce the last inch in diameter.

On the other hand, the spruce on the second stand is growing at the rate of one inch in six years. The breast height diameter of the average spruce is 2.8 inches, of the average balsam is 1.9 inches. If the present rate of growth should continue for twenty years the diameter of the average spruce will be 6 inches which is the culminating diameter of the first stand.

In the second stand there are now 45 spruce in the 3-inch class, 30 in the 4-inch class and 10 in the 5-inch class. Twenty years hence these should have reached the 6, 7 and 8-inch classes respectively and should yield a merchantable volume of 497 cubic feet or about 5.6 cords.

The balsam are younger and smaller. There are now 21 3-inch trees and 6 4-inch trees which should be in the 6 and 7-inch classes twenty years hence with a volume of 137 cubic feet or about 1.5 cords. Both species should yield over 7 cords per acre.

These calculations do not take mortality into account. Since the stand is even-aged young and thrifty there is little likelihood of loss by wind. The balsam is still too young to be very susceptible to the spruce budworm. But if the entire balsam and pine stock be considered to represent the mortality there will still be a cut of nearly six cords per acre when the stand is fifty years old.

The deductions from the foregoing comparisons are that the most profitable time to harvest the crop from the second stand will be at an early date after its fiftieth year, before the closing crown cover and shortage of soil nourishment seriously retard growth, and before mortality makes material inroads into the stand.

Lighted tobacco and matches are especially destructive in the forests. Live forests mean employment; dead forests employ nobody. Do not be responsible for a dead forest.

Portable gasoline pumps up to ten horse power and capable of forcing water through 1,500 feet of hose are now used in fighting forest fires by Canadian federal and provincial forest services.

TRADE MARK

A FIRE ALARM

The prosperity of the Pulp and Paper Industry and of many other industries depends on the maintenance of

OUR FORESTS

Fires annually destroy more timber than is used by all the industries depending on it. A moment's carelessness may cause an irreparable and national loss.
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THE ILLUSTRATED CANADIAN FORESTRY MAGAZINE

VOL. XVII. OTTAWA, CANADA, NOVEMBER, 1921. 471 No. 9

Our Yukon, its Forest Wealth and Future Development

By H. H. Rowatt, Sup't. Mining Lands and Yukon Branch, Ottawa.

The products of the forests in the Yukon Territory have played no mean part in the development of that district. The wooded areas are of much greater extent than any person unfamiliar with Northern Canada and the territory of the Yukon has any conception of. Naturally the growth is slow. The number of years it has taken the trees to reach a size that would be useful is staggering. One wonders whether a miner, prospector or trapper ever thinks when he first puts his axe into a growing eight-inch tree in the North these days that that tree entered on its career sometime about the date of the coronation of Queen Victoria.

The principal forest trees are white and black spruce, balsam poplar and birch. These occur on the mountain slopes up to eighteen hundred feet and sometimes up to twenty-eight hundred feet above the rivers and lakes. The white spruce is the most valuable tree and furnishes good timber for building and mining purposes. The best groves of this tree are found on the islands or on the alluvial flats along the rivers, but good specimens have been observed on the slopes of the hills to a height of two thousand feet above the rivers. There is a marked deterioration both in size and appearance of the spruce as the more northerly branches of the river are approached.

The balsam fir occurs only on the valley slopes mixed with spruce, beginning at an elevation of twelve hundred feet above the rivers and continuing upward to the limit of the trees. On the slopes of the Ogilvie range, however, the balsam disappears entirely.

In the Heart of the Yukon.

Well Timbered Valleys

On the Pelley River between the Macmillan and the Lewes the Northern exposures are thickly wooded. There are numerous groves close to the river, with good spruce up to two feet in diameter. Spruce of the same size is also found along the upper Pelly, but not so plentiful. In different parts of the territory one sees, very occasionally, a grove of jackpines. It is considered that the best timber in the Yukon Territory is situated on the Macmillan river, a tributary of the Pelly. The valley of this stream is well timbered for about one hundred miles from its mouth. The breadth of valuable timber along the valey is about half a mile in many parts. The spruce is straight, tall, and averages about twenty inches in diameter and some have a diameter of about three feet. These trees carry the size well up, and are capable of furnishing five twelve-foot logs to the tree. The prevailing trees on the river-flats of the Pelly River are cottonwoods, aspen, alder, spruce and willows.

The Yukon Territory has produced roughly about one hundred andfifty millions in gold. A great proportion of that gold would never have been produced were it not for the fact that there were trees in the Yukon Territory of sufficient size and in sufficient quantity to enable the miner to obtain at reasonable rates logs, lumber and wood. Lumber, of course, is not one of the exports of hte territory. The only products exported from that district are gold, furs, mastodon bones and a few live animals required for fur-farming purposes.

The Fuel Question

The great rush of miners and prospectors occurred in 1898, and the largest centre of population was and is the City of Dawson. To provide lumber for houses, stores, public buildings, sluice boxes and other mining purposes there were at one time four sawmills at Dawson with an aggregate capacity of ninety thousand feet per day. There were also sawmills at Selkirk and White horse. In addition to lumber, it should be remembered that wood formed the only fuel supply worth mentioning. There is coal in the Yukon but not conveniently situated to the main consuming centre. It was and is used to some extent, and of late years it has been used to a great extent by the river steamboats. This is due to the fact that the wood supply along the Yukon and Lewes Rivers between Dawson and Whitehorse has been heavily drawn upon for the last twenty years by the steamboats and it eventually became necessary for the steamboats to obtain some other kind of fuel, as the cost of wood delivered to the river bank became exorbitant.

Up to the end of the last fiscal year there has been cut in the Yukon Territory about two hundred and twenty million feet of lumber and three hundred and fifty thousand cords of wood on which Crown dues have been paid. The Crown has received in dues for timber cut in the Yukon Territory about $611,000.00. The figures given are no indication of the total cut, as wood, logs and lumber used for mining purposes are not subjected to the payment of Crown dues and the amount used for such purposes can only be roughtly estimated. Mining is practically the only industry in the Yukon Territory. Logs and poles are used for cabin construction, for timbering shafts and tunnels. Wood was used for thawing purposes before the introduction of stream thawing devices, for fuel in boilers after the introduction of machinery, for fuel for dredges until the introduction of hydraulic electric power, and lumber was used for sluice boxes and flumes. When it is considered that for all these purposes the products of the forest were used without the payment of Crown dues, it is thought that it would be safe to say, in order to arrive at an estimate of the total cut to date, that the amount on which Crown dues have been paid might be multiplied by three. This would result in an estimate total cut of over one million cords of wood and six hundred and sixty million feet of lumber. This would mean that the timber resources of the Yukon Territory have been diminished to that extent to produce gold to the value of one hundred and fifty million dollars.

The Yukon's Future

The Yukon Territory is only in its infancy. There is untold wealth in minerals not yet developed. There are tens of thousands of square miles not yet prospected. Its future is all before it. There are large areas of magnificent grazing lands on which many herds of cattle will some day be turned loose. Today, the population is counted by the thousands, but for every thousand now there will be hundreds of thousands some day. There is great timber wealth not yet touched, and the miners and settlers for many generations will probably find ample timber resources for their purposes.

British Columbia's Way of Enforcing Fire Laws

By C. S. Cowan, Assistant Provincial Forester

Victoria, B.C., Oct. 11, 1921.
Canadian Forestry Magazine, Ottawa.

Your letter of October 4th is received.

THE procedure we are carrying out in British Columbia is this: The Forest Act makes provisions for the issuance of permits for fires during the close season. Regulations under which camp fires can be built as well as regulations which cover the conduct of smokers, blasting operations, land clearing or any industrial purposes within **one half mile** of Forest or bushland have been made. Having passed legislation concerning these things, a penalty was also provided for non-compliance. So long as we have a law which we do not enforce so long will it be disregarded, therefore when a fire occurs as a result of contravention of the Act, our ranger's first job is to get this fire out and the next is to secure his evidence and lay an information. Very often we cannot get actual eye witnesses but the circumstancial evidence is taken, as the Forest Act lays the onus of proof upon the defendant. These are cases, of course, where we bring an action and where we know we will not gain conviction but even in such cases the prosecution of suspected individuals may have a good effect, for it shows that our men are on the job and sooner or later they will be caught.

In dealing with infractions of the Act, where a case is contentious it is referred to the District Forester for advice as to whether an action should or should not be brought but our instructions this year made it clear that the Field Officer who did not gather, where possible, evidence as to the origin of a fire was as much derelict in his duty as a man who did not do his best to extinguish a fire.

It is a good thing in Forest Protection services to keep a fire curve for each man, i.e., the number of fires reported each week and where peaks occurred to analyze the given causes. The percentage of fires of unknown origin should be small, the percentage of fires caused by campers would show the need for greater vigilance and education. The number of railway fires will point to the necessity for a properly organized and efficient patrol force as well as close inspections of locomotives, fire appliances, and so on.

As to the imposition of fines, that is a matter which rests in the hands of the local magistrates, but if our men carry out their functions in a workmanlike manner, convictions must be gained and a fine must of necessity be imposed, or failing that, a jail sentence. It would appear to me good policy to enroll each magistrate on the list of Forest Protection enthusiasts. There are certain districts where this is not so and such magistrates are avoided.

To sum up, we have at last grasped the very point that we have been preaching for years, that 90 per cent of our fires are caused by human agencies and any means which we adopt to prevent such occurrences is a step in the right direction. We have advertised for years: this is the velvet glove. We are now showing that the quality of firmness is still retained inside the soft cover.

There is, in reality, little sympathy in this world for the wrong doer, and our men really gain in local esteem by the proper carrying out of their legal functions.

The Forest as a Perpetual Wood Factory

Nature, without Human Guidance, is as Incapable of "Running" a Forest on an Economic Basis as "Running" a Farm.

By Dr. C. D. Howe, Dean, Faculty of Forestry, University of Toronto

> "Ninety-five per cent of the trees in a forest sacrifice themselves that others may live."
>
> "I have seen Western hemlock seedlings at the rate of 3,000,000 to the acre; yet, when these trees reach maturity, scarcely a hundred will be left upon an acre."
>
> "Nature has no economic sense. The function of foresters is to improve upon nature as expressed in the forest and guide her into economic channels, just as the farmer has improved upon nature in his work and compelled her to serve his economic purposes. Where would we be to-day if the farmer had allowed nature to have her own way?"

THE FOREST.

As I understand it, the primary object of forestry is the production of wood of a certain quantity and of a certain quality under certain given climatic and soil conditions. The material which we call wood is a certain chemical substance produced in large quantities only by certain types of plants which we call trees. If the chief object of a forester is the production of wood, then it goes without saying, that he must understand how wood is produced in nature, that is, he must understand the physiological relationships of trees: how they manufacture their food, how they digest their food, how they assimilate the digested food and transform it into wood. Now, we know that certain things external to the tree influence its wood production. These are particularly the climate and the soil. In order to produce the largest quantity of the most desirable quality of wood, the forester must understand how trees are influenced in their growth by the climatic and soil factors, that is, he must understand the biological relationship of trees.

While a forester must understand the life relationships of individual trees, I believe that in order to be successful in his work of producing wood, he must acquire a broader conception of forest life. He deals not with single trees alone, but with tree aggregates, with tree communities. These tree communities, like communities of humans, have their mutual relationships, their dependencies, and their interdependencies. And like other living communities, they have their stratifications, their laws of reproduction, development and decay; their laws of progression and of retrogression. By this I mean to say that in order to do his best work, a forester must have the broader vision which regards the forest as an entity, an organism with its own peculiar structures and its peculiar functions; an organism which has its period of birth, of infancy; its juvenile period, its adolescent period, its period of maturity and decay.

A beautiful glimpse of the forest ranger's cabins on the Clearwater Forest Reserve, Alberta.

"It takes all kinds of people to make a world," and it takes all kinds of plants to make a forest. The reformer or the politician will fail, if he recognizes only one class in human society, so the forester will fail who sees only and thinks only about the pines and spruces, or whatever the commercial class may be in his woodlands.

The Forest's "Middle Class."

In the forest the differentiation of the social structure is just as pronounced as in the city of Toronto. There are the meek and the lowly in the forest; even those who live in the dark places beneath the soil cover. There is the great middle class of ordinary every day trees. They make up the bulk of the forest and give it stability and character. And then then there are the few dominions, the aristocrats, who stand head and shoulders above their associates. They indicate what might be accomplished in the forest world if living conditions were equally good for all. To state the case more specifically there is a greater or less number of vertical layers of vegetation in every forest: a moss layer, an herbaceous layer, a layer of shrubs or seedlings, a layer of saplings, a layer of suppressed trees, of co-dominant and of dominant trees. This is called vertical zonation, and it results from the fact that there is a difference in life conditions at the ground and at various heights above the ground in a forest. This leads to a differentiation in structure of the forest, just as there is a differentiation in the structure of a tree itself. The conditions in a forest also vary in a lateral direction. The soil may vary from place to place; here sand

Looking along Brown Creek on the Clearwater Forest Reserve, Alberta.

and there clay. In one place the soil may be so thin that trees cannot grow; in another place the soil may be damper than the average and a stand of different trees result, or there may have been a windfall and conditions are changed so that another kind of tree comes in. These horizontal differences result in alternation in the structure of the forest.

Mortality in Juvenile Trees.

Now, a forest regarded as an organism not only has structures, but it has functions of its own apart from the functions of individual trees. The first of these is reproduction, which consists in the production of seeds and their germination. When the seeds have germinated they they must establish themselves on the area. Whether or not the seedlings will live depends upon the natural vigor of the seedlings, the amount of food material stored in the seed, the length and vigor of growth of the roots, the ability to endure drying-out conditions. When seedlings have succeeded in establishing themselves, they at once come into competition with seedlings of their own kind or those of other trees, and as you know this competition continues throughout life. We do not know, by experimental evidence at least, why some succeed and others fail, but we do know that the slaughter is terrific. I have seen Douglas fir seedlings at the rate of 500,000 to the acre, and Western hemlock at the rate of 3,000,000 to the acre; yet, when these trees reach maturity scarcely a hundred will be left upon the acre. The ordinary coniferous tree requires about four square feet of soil when 20 years old, and 150 square feet when 100 years old. There is neither room, food nor light enough for them all. The fit survive and the weaklings die. As a rule, 95 per cent of the trees in a forest sacrifice themselves that others may live. Competition then is one of the normal functions of a forest.

Another function is succession. By this is meant that the composition of the forest is constantly changing until it finds itself in equilibrium with the factors of soil and climate which have brought it into being. The familiar illustration of this is the birch and poplar on the burned areas. They control the ground for 20 or 30 years, then, if there is reproduction of the original forest, it in turn gains its normal control. Vegetation through its influence on light and soil conditions is constantly making conditions less favorable to its own kind and more favorable to another kind. This results in succession, one of the most pronounced functions of vegetation and nowhere more pronounced than in the forest, to those who have the eyes to see.

As I have just said, succession ends in a forest in equilibrium with the factors of its environment, that is with its climatic and soil conditions. We call such a forest a climax forest, and we regard it as stationary. This conception is perhaps satisfactory if we look ahead only 100 years, and as foresters we should look ahead that far. But freeing ourselves from this cramped vision, we can look still farther ahead and say there is nothing fixed and stable in nature and, therefore, in the strict sense of the word, there is no stationary type of forest. In the first place, there would always be minor fluctuations, due to openings from natural causes, such as windfalls, lightning, and consequent changes in the light relations. There would also be wider fluctuations due to biological causes. For example, a light-demanding species such as the pines cannot control an area for more than one generation. The white pine in central Ontario cannot be considered as a climax type, especially when in pure stand. It cannot reproduce itself beneath its own shade; therefore it must give way in the end to a shade-enduring species, such, perhaps, as the balsam in the northern portions of its range in Ontario.

Northern Ontario's Winter Crop. An operation on Pickerel River.
Photo by C. Harding, Pakesley, Ont.

The Forest as a Wood Producer.

Coming back to our conception of a forest as a community with its own particular activities, we note another fact of general application, and that is, that a forest community reacts upon its environment, qualitatively and perhaps quantitatively, as does a community of human beings. The human community reacts upon its environment by clearing the forest, tilling the fields, building houses, harnessing the power of boiling and falling water and the lightning in the skies. The forest does things just as wonderful. The forest harnesses the energy from the sun; it solidifies the carbon of the air; it adds a very dilute solution of mineral salts and transforms them into wood. It is the function of the forester to regulate and direct the growth-energy of the forest.

Just as in a human community the individuals react upon each other so in a forest community. No tree can live surrounded by other trees and be the same tree that it would if it were living alone in the open. This leads to a change in the form of a tree, and it is the function of a forester to fashion that tree into the form which best serves his purpose. The forest community reacts upon its local climate; the temperature, the humidity and the precipitation are not quite the same as in the open. The forest community reacts upon the water regime, the storage and the drainage of waters.

Of greatest importance to the forester who is to direct and regulate wood production is the reaction of the forest community upon the soil conditions. The forest is the great restorer of the soil. You know the vegetative cycle and you know how the forest keeps that cycle unbroken. A larger percentage of its contents comes from the air than in the case of the field crops, the trees being chiefly solidified sunshine. Not only the material taken from the soil, but the additional material taken from the air, decays upon the soil and thus the soil is enriched year after year, generation after generation. The soil is the cemetery of the ages. In order to have something living there, something must be dying there. The forest quite literally lives on the bones of its ancestors. The character of the forest today depends upon the successive generations that have gone before. The accumulated vegetable matter in the soil increases its waterholding content, and thus replenishes and regulates one of the most necessary and most variable factors in plant life. You know, the decaying

(Concluded on page 505).

A Shelter Belt of Trees for Every Prairie Farm

How to Make Tree Planting Successful under Conditions of Limited Moisture—How to keep down Grass—Some Common Difficulties and their Solution.

By Archibald Mitchell, Western Lecturer of he Canadian Forestry Association

IT SHOULD not be difficult for us to understand how necessary it is for us to have belts of trees to shelter our homes and playgrounds on the Prairie.

This Prairie is very bare, and high winds often sweep over it making it very unpleasant sometimes for the people living threre.

Trees are the means nature has provided for breaking up these winds, and as fast as she can, nature is covering the Prairie with trees. Further North and East, this tree covering is quite general, the whole country being almost entirely under trees, and as you would expect, the winds there are neither so high or so frequent as we find them out in the open.

This natural tree covering has spread very rapidly onto the Prairie in the last ten or twelve years and thousands of little bluffs of native popular are now to be found in many districts where formerly there were none. The reason is not far to seek for the people who have come to live there during these years have kept the fires down which used to run all over the country nearly every year, burning the grass and the little bluffs just about as soon as they had got well started.

We do not know how far this natural tree covering would spread, but so far as we have seen, there does not seem to be any reason to doubt that if human population moved out the whole Prairie would in time become almost entirely covered, the same as in the North, if the fires were kept from burning as they used to do before the settlers came in.

This natural tree-covering would possibly take hundreds of years to accomplish but as the trees would interfere with our farming, it will never of course be allowed to be completed.

Saskatchewan has made excellent progress in the beautifying of school grounds with trees and shrubs. There are subtle education influences in a beautiful tree-enclosed playground which no pile of text books can rival.

Another successful tree planter under prairie conditions is Mr. John W. Lucas, of Cayley, Alberta. The photograph shows a wood lot of 2,000 trees planted four feet apart. This is a big asset that adds value every year with practically no human labour, now that the trees have established themselves and killed out the grass.

At the same time it is good to know that trees will grow naturally if they are given a chance, when we are thinking of planting trees. We know we need not fail if we go about the business the right way.

One very encouraging thing the last few years have taught us is that, even if we did not have rainfall enough for grain crops during these years, we had enough for trees. If we had not, then all the trees on the Prairie would have died, both those grown by nature and those planted by man. But we know they have not, and there are thousands of trees living today that have withstood the dry years. No doubt some of you will remember having seen many planted trees which have died during the dry years, but there is always another reason somewhere. They died not because enough moisture in the shape of snow or rain did not fall. That was not the reason. Enough rain fell, but the reason the trees died was because the most of the rainfall was lost before the trees could use it.

How to Save the Moisture.

And this brings us to the most important part of our subject and the real secret of success in tree planting on the Prairie, the conservation or saving of enough of the moisture that falls every year so that the trees will be able to keep on growing.

We must remember too that Western Canada is not the only place in the world where this moisture saving is important, for many other countries have the same problem and yet they grow large forests there.

The mention of the conservation or saving of moisture immediately suggests the question, "how do we lose it?, and the answer is very simple and easy to understand for it is lost almost entirely through the action of the sun and the wind. Everybody has seen wet clothes hung out on the lines, and you have all seen how quickly the sun will take up the moisture and dry the clothes.

Some of you no doubt have also noticed that the drying takes place much quicker on a breezy day, showing that the wind has a great deal to do with drying up the moisture. If this is true in the drying of clothes, it is also true in the drying of the Prairie soil and in our tree planting it should be very natural to conclude that if we could keep the sun and the wind away from the soil in which the trees are growing, there would be a far better chance for them to have enough moisture to enable them to live.

We find this is quite true, so true indeed, that the whole success of tree growing depends on it. Those of you who have

Another view of Mr. Lucas' shelter belt at Cayley.

seen the little bluffs of native popular now taking possession of the Prairie in certain districts will remember that this is just the way that nature does. The trees in the little bluffs are very close together and no wind can blow through them to dry up the moisture, and the leaves form a more or less dense shade which keeps out the sun.

How the approach to the school door at Assiniboia, Sask., has been improved by the planting of trees and shrubs. The children of the prairie communities are entitled not only to splendid school buildings but to beautiful school grounds.

Take a Lesson From Nature

This is nature's way, and in our planting we just follow nature and plant our trees close together using varieties that will give us plenty of shade. We plant them four feet apart each way and use a lot of Manitoba Maple along with the other trees to shade the ground because their leaves are large and close, making it one of the very best trees for the purpose.

Very small plants are used. They are best only about a foot high, and of course while they are so small they can not keep much wind or sun out, so we cultivate the soil between them to act as a moisture keeper till trees are big enough to do it for themselves. This is easy to understand, for after all, surface cultivation only creates a dry loose layer of soil which lies on the ground and keeps the wind from touching the moisture down among the roots and also keeps the wind from shining directly on it. It is only a kind of artificial sunshade and wind shield and has to be renewed every week or two for the first few years till the trees are big enough and branchy enough to protect the moisture by themselves. Usually three years of this cultivation is enough if the trees have been planted four feet apart and the right varieties used. To help out the trees in protecting their moisture and also to save a year's work with the cultivator, it is a good plan to spread four or five inches of manure or straw under the trees. The best time to do this is at the end of the second year when the trees are bushy enough to keep the wind from blowing the protection away and at the same time not too bushy to make it difficult getting the straw or manure mulch, as it is called, in among the trees. This mulch is useful in two ways for it is always loose and open enough to allow rain and melted snow to find their way down to the soil below, and, as we have seen, it acts as a screen which keeps the sun and the wind from stealing the moisture from the soil. The mulch is never taken off and may be added to every five or six years as may be considered necessary.

Plant Broad Solid Blocks.

To still further assist in moisture preserving, the strip of trees should be about four rods wide, as a broad, solid, block of trees keeps the wind out of a plantation far better than a narrow one.

Besides, the broad belt provides a far better shelter in winter when the leaves are off and when shelter is most needed.

It will now be easy to understand how this close planting and mulching helps to keep down the cost of establishing the plantation, for if the trees were planted wider apart they would have to be cultivated for several years longer till they were big enough and branchy enough to take care of themselves.

In 1907 Mr. C. Gardiner, of Cayley, Alberta, took a few days off to plant trees about his home and part of his farm. To-day he has not only a better looking home but one much more comfortable to live in than would have been the case had he believed "you can't make trees grow on the prairie."

Cultivation takes time and money, so that in reality it is far cheaper to plant trees four feet apart than six feet or wider.

You may require more trees but the time taken up in cultivation is very much less.

This matter of expense in establishing a plantation is one of the three principal points that must be borne in mind in planning a plantation. The other two are, "Rapid growth" and "Permanency", and we get both of them by using certain kinds of trees.

Rapidity of growth is very important for we don't want to wait any longer than we can help for the shelter we need. The best tree to give us rapid results is the Russian Popular (Populus Petrowskiana). It is very cheap and grows readily from cuttings ten inches long, which also have the additional advantage of being easily planted. A cutting of this size will grow to about eight or nine feet in three years and as many of them will be from twelve to fourteen feet in four years and from twenty-five to thirty in ten years, it will be easily seen why we should plant plenty of Russian Poplar.

Russian Poplar a Favorite.

But Russian Poplars are supposed to live only about thirty years. That is to say, we have only had them growing in Western Canada for about that time, and we really do not know how long they will last, but, to help out the life of the plantation we use a few Ash and Elm among the other trees.

They are native and, with the maple will grow for 60 or 70 years or even longer.

Mr. N. J. Anderson, Secretary-Treasurer of the U. F. A. at Barnwell, Alberta, is a great tree planter. He has succeeded in the driest years the West has passed through. His farm is good to look at, has a much higher selling value, and is able to produce abundant crops of vegetables because of the shelter from winds. To Mr. Anderson tree planting is a sound business investment

Thus you can see the variety of trees we use in our plantations is very important and we find that about the best mixture consist of rows of Russian Poplar and Maple alternately, with every fourth tree in the maple rows consisting of Ash or Elm. It is a good plan too to have the outside row of Caragana. This is a bushy plant and it helps still more to keep out the wind.

Plan Your Shelter Belt

Shelter belts to protect the farm building should enclose three sides of a square and sometimes even part of the fourth side may be planted. It is usually better not to have the solid tree belt in front of the house as it tends to shut out the view too much. It is better there, to have a well-trimmed hedge of Caragana with a row of shade trees beside it to act as a partial screen and also to afford a certain amount of shelter.

The ground for such plantation should be prepared by summer fallowing it thoroughly the year before it is planted, disking well early in spring, and plowing not later than the second week in June following with regular cultivation till the fall. If it is to be on new breaking, it will be better to work it up two years before planting it.

Beautifying School Grounds

School plantations will of course be much narrower than farm belts because the playground is usually not very large and there may not be more room for more than four or five rows. In such a case the outside row should be caragana and the others maple and Russian Poplar alternately in each row. The inside row may be either Caragana or Spruce or Pine.

Ornamental planting of the home or school grounds with large trees and shrubs is a different matter from shelter belts and will require different treatment.

All trees must be planted firmly.

In conclusion, I trust that this little talk on Tree Planting on the Prairie will have made several things clear to you.

First.—That the moisture in the plantation is the important thing.

Second.—That we get enough moisture on the prairies every year if we can only keep it.

Third.—That our two chief moisture robbers are the sun and the wind, and that if we can keep these two out from among our trees we are assured of moisture enough every year to keep them growing.

Fourth.—We find nature manages this very well by growing her trees close together so that neither sun nor wind can get to the moisture to dry it up.

Fifth.—To be successful in our plantations we have to arrange our trees with the same object in view, planting them four feet apart each way and using varieties that will shade the ground.

Sixth.—A mulch of straw or manure at the end of the second year will be of great service in helping to preserve this moisture.

Seventh.—All trees and cuttings should be planted firmly.

Lastly.—Remember that the saving of the moisture is the secret of success.

(Editor's Note:—One thousand western school teachers will read the foregoing talk to their pupils in January. This is part of the winter programme of the Canadian Forestry Association.)

An Aeroplane Stabilizer.

Paris.—Georges Aveline, an engineer, has invented a stabilizer for aeroplanes which, it is claimed, will make it possible for the pilot to leave his post while the machine continues flying automatically. The appliances have been tested by the Messageries Airennes Company with success, it is said, on the Paris-Amsterdam line on the large passenger-carrying machine. The machine flew the whole route without the pilot, it is reported, once touching the levers. Great importance is attached to the result by French aviation experts. It is declared that it will add enormously to commercial flying. In a fog or thick clouds the appliance, it is claimed, assures the aeroplane keeping the correct course. At night small electric lights reveal any deviation immediately.

Aeronautical Evolution.

London, Eng.—The aeroplane of the future, according to the prediction of a writer in London Tit-Bits, may be driven by steam turbines, navigated by a pilot on the lookout, who will transmit his orders to the engine room like the captain of a ship. It may be able to land almost anywhere, and be large enough for use in war time to carry groups of soldiers for tactical operations. There is even a suggestion that a manless type may be evolved, for the torpedoing of battleships, from the air or the ramming of enemy aircraft. An apparatus is being developed at the Royal Aircraft Factory for automatic mechanical control of machines, both longitudinally and laterally, by means of a gyroscope. With the advent of large twin engines, and machines with four or more engines, the demands on the strength of the pilot when moving large controls began to approach the physical limits of the ordinary man, and the complication of the gasoline supply put a severe strain on the mental capacity of the pilot. A machine is now being constructed in which the depth of structure of the wings are such that engines can be installed in the wing structure. Another possibility is that of completely reversing the blades of the propeller, to act as an air brake.

Made New Record.

Hendon, England.—John H. James in winning the aerial Derby here Saturday made a reord for the event. James covered the 200 mile course in 1 hour and 14 minutes, or on an average speed of 163.34 miles per hour.

ILLUSTRATED
Canadian Forestry Magazine

Published and owned by
Canadian Forestry Association,
Jackson Building, Ottawa, Canada.

SUBSCRIPTION RATES
With Membership in Canadian
Forestry Association - - - $2.00 a year
Contributing Membership - - $5.00 a year
Life Membership - - - - - $25.00
SINGLE COPIES, 20 CENTS.

ROBSON BLACK, *Editor and Manager.*

EDITORIAL

CALL IN THE POLICEMAN!

HAS not the time arrived when the "bite" of the forest protection laws throughout Canada should be supplied with a few front teeth?

It was inevitable, of course, that lawmakers and law enforcers sharing the popular tradition of "inexhaustible forests" and "unscratched resources" should equip statutory penalties for timber destruction with semi-nullifying devices. Until very recently, a small percentage only of the Canadian people took any serious interest in forest conservation or believed for a moment that the nation's timber resources were in the slightest peril. Even today to tell the man on the street that Canada owns not more than one-third of the timber growing in the United States brings an incredulous stare. To tell him that Canada's problems in forestry are more imperative and economically vital than tariffs, good roads, votes for women, or the exchange rate, provokes a patronizing smile, albeit a willingness to hear more and be convinced. Is it much wonder, therefore, than the "bite" of our forest protection laws, as regards penalties for carelessness in causing fire, has reflected the indecision, the indifference and lack of conviction characteristic of public opinion. Magistrates are prone to inflict the maximum penalty on the "vandal" who burns down his neighbor's woodshed, because that is the measure of public indignation, and seem equally prone to treat with compassion the "unfortunate fellow" who destroys ten million feet of our small reserve of white pine.

In many parts of Canada, however, a change has come about. Penalties have been increased, loopholes have been blocked and, mainly through the good work of the Government Forest Services and the forest protective associations of Quebec the sympathy and co-operation of local magistrates in many places have been won. Probably the indifference of the local magistrate stands less in the way than the indifference and lack of punch in the local protection officers. Some districts in British Columbia, for example, have this year received such a vigorous demonstration of law enforcement that campers,farmers, and others likely to start fires now look upon carelessness as costing so much an ounce. In fact, a good many of them, having been found guilty of damaging the forests by fire, are now paying their fines, as some people pay for a phonograph, with "five dollars down and five dollars a month." The instalment plan of paying fines looks like a new find in psychology, spreading the painful lesson over many months.

Educational propaganda is the finest possible fire preventive with the great majority of people, but it needs a stiff supplement in legal penalties for the stubborn residue.

WHAT CANADIAN YOUTH IS FED ON.

FROM a widely circulated set of books for children, the Canadian chapters of which were edited by a Principal of a Canadian university, since deceased, the Canadian Forestry Magazine culls a few amazing blunders concerning the forest wealth of the Dominion. Considering that the book claims to represent the tested wisdom of all the best authorities, it is difficult to overestimate the mischief wrought in the child mind by such "information":

"Canada today is the richest country in the world in wood resources and forest areas."

(The fact is Canada has about one-third the wood resources of the United States).

"It has been stated that if the United States did not cut another stick of pulpwood for two hundred years and the Canadian trees should stop growing and remain in their present condition there would be enough pulpwood to keep the two countries going for more than two hundred years."

(Lop off 175 from the 200 years and the statement would be more nearly correct for Canada East of the Rockies. As regards West of the Rockies ,the pulpwood would not "keep the two countries going" at all unless the mills, the towns, and hundreds of thousands of our eastern population moved across country to the Pacific Coast. Pulp and Paper industries must live "on top of" their forests. There's no such thing as shipping bulky raw material such as pulpwood from Vancouver Island to Bathurst, New Brunswick. Well, hardly!).

"The Georgian Bay district contains the largest area of white pine in the world, and sufficient to supply the trade for a number of years."

The foregoing quotations are quite sufficient to indicate the stuff fed to Canadian children these many years.

With such spread-eagle teaching of "unscratched resources," what incentive to conserve can be developed in the mind of young Canada? We save only what we value. We worry only in face of an expected misfortune.

If, as these ill-written children's encyclopoedias teach, Canada is packed so full of timber that human comprehension stands aghast, what attitude can we expect from the next generation except that the present policies of forest devastation (being Canadian) are the greatest and wisest in the world?

DON'T SPEND FROM CAPITAL!

ANY one acquainted with life insurance policies or the Canadian Government Old Age Annuities knows the arrangement by which the policy holder at 60 or 65 years of age obtains ten per cent or more on his investment but only by the gradual extinction of the capital sum. In other words he may enjoy a guaranteed life income until 85, far higher than the interest return, if he is content to leave no estate when he passes away.

How does this apply to the methods now in vogue by our provincial governments in forest financing? The provinces of Ontario, Quebec, New Brunswick and British Columbia own their forest lands. The limit holders are lessees of the timber growing thereon. They follow state-made regulations. Their title in the timber, not automatically renewable, is subject to forestry regulations, increases in dues, and whatever other provisions the state may impose. In other words the Governments are the bosses of the timber resources and are the legal and moral trustees in forest perpetuation. When a government "sells" a timber berth it does not sell its responsibility for keeping that berth in productive condition as a legacy to the next generation.

For many years past, the annual pillage of forest fires, insect depredations, etc., and the general lack of an effective scheme of forest management has kept our forest resources in a state of progressive deterioration. The United States Government considers that annual growth or increment of timber does not equal one-fourth of the annual timber cut. Applying even half that ratio to Canada we see at once that with the added inroads of forest fires and insects our forest possessions (certainly east of the Rockies) cannot stand the strain very much longer.

Is it wise or prudent that with a property travelling the road to eventual insolvency, any government should take millions of annual revenue out of the capital account of public-owned timber, Is it good business to regard the forest resources as the savings account solely of this transient generation, from which we may enjoy a high annuity at the price of extinguishing the capital investment?

Just as surely as we weaken our capital account in forests, will the annual interest become progressively poorer. No government can extract timber dues from a barrens, or collect taxes from the owner of a sand dune.

If a province spends half a million on forest fire prevention and the timber losses run over two millions a year, is it not common prudence to spend another half million to blocks the inroads of fires?

If common sense management of timber cutting will increase reproduction of the best forest species, and maintain the capital stock of the forest for all time to come, is it not a fairly bright idea that twenty-five per cent of our forest revenues should be devoted to such an achievement?

When a million dollars a year could give a province a highly effective forest service, with an A-1 personnel, qualified to provide a perpetual insurance policy on the timber resources and the regularity of large state revenues from timber sources, is it a reasonable policy to rob the replacement account of this mighty resource in order to save the tax payer of 1921 from meeting his bills for roads, court houses, and such other public services?

A high provincial income from timber sources today means a low provincial income tomorrow unless replacement of forest capital is provided for from current receipts.

Crowded Europe Retains Greater Percentage of Area under Timber than Uncrowded Canada.

Note how the chief nations of Europe have retained as timber reserves percentages of their total area far in excess of any of the Prairie Provinces of Canada.

IN THE FOREST RESERVES OF WESTERN CANADA.

	Acres.	Percentage of total area.
Alberta	16,711,776	14.00
Saskatchewan	6,197,707	3.97
Manitoba	2,606,400	1.75

IN THE FOREST RESERVES OF EUROPE.

	Population per square mile.	Percentage of total area in permanent forest.
Belgium	652.	18.3
France	189.5	18.7
Germany	310.4	25.9
Switzerland	234.4	22.7
Sweden	32.4	47.8
Russia in Europe	64.6	31.0

A SOLDIERS' LIVING MEMORIAL.

Victoria, Oct. 3—Lieut. Gov. Nichol yesterday afternoon planted the first tree in what it is claimed, will be one of the outstanding war memorials of the empire, in the form of an avenue, which when completed, will contain one tree for each British Columbia soldier who lost his life in the great war. An enamel plate will be embedded at the base of each tree.

BOOK REVIEWS.

Forest Mensuration

By Herman Haupt Chapman, M.F. Harriman Professor of Forest Management, Yale University Forest School.

This book contains a thorough discussion of the measurement of the volume of felled timber, in the form of logs or other products; the measurement of the volume of standing timber; and the growth of trees, stands of timber and forests. It is designed for the information of students of forestry, owners or purchasers of timberlands, and timber operators. The subject matter so treated is fundamental to the purchase or exchange of forest property or of timber stumpage, the valuation of damages, the planning of logging operations, and the management of forest lands for the production of timber by growth.

It is intended as the successor of Graves' Forest Mensuration, and was undertaken at the request of the author, H. S. Graves, whose original text, Forest Mensuration, appearing in 1906, set a standard for text-books in forestry and has been of inestimable value to foresters and timberland owners in America. The present text is not a revision of the former publication, but an entirely new presentation.

Progressive Forest Policies Cannot be Postponed

"Whether we have a high tariff or no tariff, an income tax or a head tax, direct or indirect taxation, are matters which concern, to be sure, the temporary convenience of the members of society, but their prejudicial adjustment is easily remediable; when ill effects become apparent, the inconveniences may be removed with but little harm to the community and none to mankind at large, or to the future.

But whether fertile lands are turned into deserts, forests into waste places, brooks into torrents, rivers changed from means of power and intercourse into means of destruction and desolation—these are questions which concern the material existence itself of society, and since such changes become often irreversible, the damage irremediable, and at the same time the extent of available resources becomes smaller in proportion to population, their consideration is finally much more important than those other questions of the day."—Dr. Bernard E. Fernow, Director of the Canadian Forestry Association.

FOR CANADA.

Canadian Forestry Association:

"Your travelling lecture car must be planting thoughts that will develop into something fine for Canada."

Dr. H. M. AMI, Ottawa.

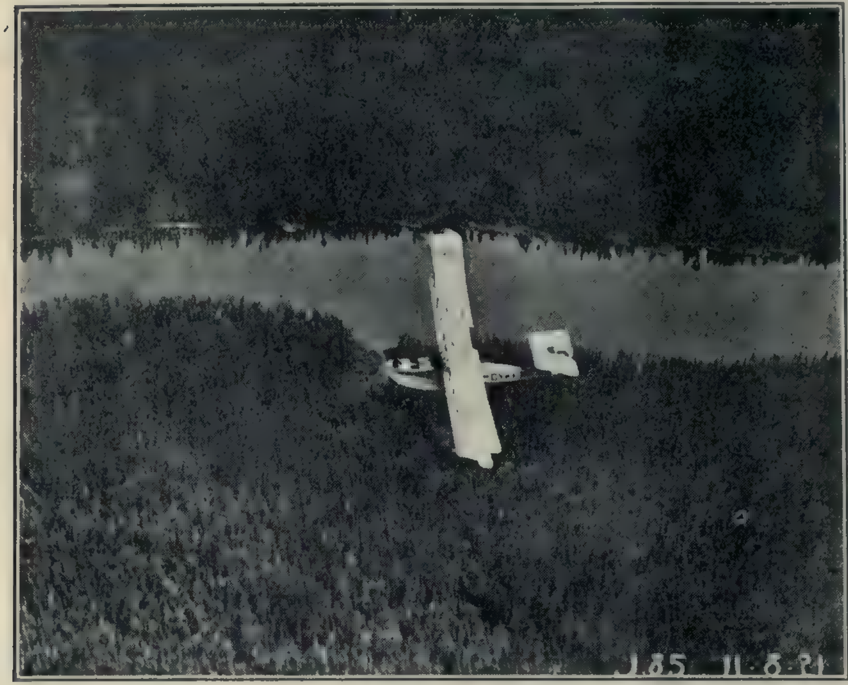
AN OTTAWA WELL-WISHER

From Mrs. W. Vaughan, Ottawa, Ont.:

"Your wonderful Forestry Magazine is such a splendid book, and I notice how it has improved so fast, I wish it success and more success.

"I have the opportunity of visiting the lumber woods at times and the magazine finds its way to different men there who appreciate it highly. It is carefully preserved and passed around the camps to read and should put a lot to thinking.

Europe Adopts Civil Aviation as Sound Business



A unique photograph taken by one plane of another while surveying forest lands in Northern Ontario

While aviation in Canada is yet in its swaddling clothes awaiting further proof of its service possibilities under Canadian conditions, it is good to turn our eyes overseas and learn what French initiative and susceptibility to new ideas has already accomplished with aircraft. In the opinion of the Canadian Forestry Magazine, no amount of timidity or prejudice can hold back the practical application of aircraft to certain of the field operations of the lumber and paper industries of Canada and Government fire prevention and forest survey projects. If time means money, as it actually does in all these enterprises, then the aeroplane or seaplane must find its place in the equipment of the progressive wood-using industry. Too much emphasis cannot be laid on the necessity for securing the most expert advice, from persons and firms concerned not in stunt flying or in ornamental aviation but in the adapting of aircraft to plain economic ends. Such firms can be found in the advertising pages of the Canadian Forestry Magazine.

An Aerial Time-table.

The countries of continental Europe, particularly France and Germany, are leading in the development, with England and Italy close seconds. Almost every capital in Europe, except Berlin, is now linked with Paris, or about to be, by regular air lines, many with daily service. In Germany, the air lanes are shorter, being mostly confined to the nation's own territory, but, it appears, they are hardly less thoroughly developed and they connect with lines that lead nearly everywhere, except to Paris. It was in Germany that a New York "Times" correspondent, in response to a telephone call, received an aerial time table, "the first complete publication of its sort in history," in the correspondent's belief.

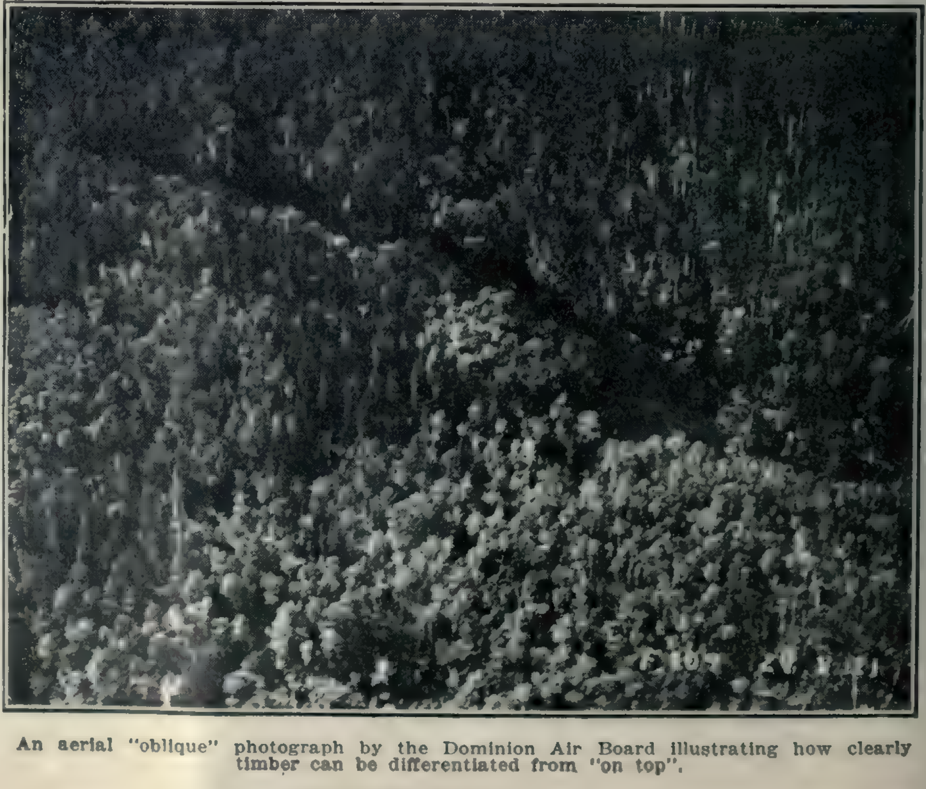
"Its mere existence," he comments, "not to speak of its contents, is surely a striking witness to Germany's development of aerial transport. A substantial booklet of nearly 100 pages, it is as matter-of-fact and substantial as Bradshaw's European Railway Time Table." "Aerial Age" (London) quotes him further:

Fourteen pages alone are filled with the details of regular daily or twice daily services to places within the borders of Germany. They give to the minute the times of departures and arrivals. There is not even a saving clause about wind and weather permitting, so that it requires quite a mental effort to realize that before one are the pathless tracks of the air and not steel railroads.

By arrangements with Holland and other neighboring countries long distance services are linked up with England and Scandinavia. There is a map which shows at a glance the principal daily services inside Germany and their communications with overseas routes.

To this regular passenger transportation all sorts of subsidiary services are being added. The flying post, for instance, is rapidly developing, especially as it is not burdened with any special regulations apart from a slightly higher tariff. All one has to do to insure this speedy delivery is to mark the letter "by flying post," and drop it into any letter box in the ordinary way. In this matter, too, international arrangements have been made so that a letter posted in Berlin at 7.30 o'clock in the morning reaches London, for example, at 5.30 the same evening.

One interesting use of the aeroplane, to which special attention is directed, is for keeping the rest of Germany in swift touch with the lost territories, such as Danzig,



An aerial "oblique" photograph by the Dominion Air Board illustrating how clearly timber can be differentiated from "on top".

or areas like Memel, whose fate is not yet determined, so that the populations of these districts shall not cease to imbibe the true gospel of Deutschtum.

Aeroplanes leave Berlin early every morning loaded with newspapers. Hydroplanes serve the same purpose for the Island of Sylt, off the coast of Schleswig, leaving Hamburg immediately on the arrival of the Berlin journals by train.

A Service Everywhere.

Reverting to the aerial "Bradshaw," a glance at the advertisements reveals still further enterprise. Here, for example, is the Hamburg-American line offering its own services to any town in Germany. It will send passengers or goods by special aeroplanes available to start at the shortest of notice. Another firm supplies aerial photographs, suggesting their particular desirability for enterprising financiers on the lookout for suitable sites for establishing new settlements and spas.

During June the machines of the Lloyd Ostflug flew 41,480 kilometers without a single accident since the start of the service. Junker all-metal cantilever-wing limousines are used on the service, and are of a type suitable for it in that, owing to the possibilities of forced landings in open country which lacks accommodation, the metallic construction renders the machines almost weather-proof.

It is in France, however, untrammeled by the troublesome air restrictions forced upon Germany by the Allies, says another writer, the Paris correspondent of the New York "Herald," that civil aviation and air transport have received their greatest impetus. Working quietly over the space of the three years since hostilities ended, we are told:

Another use of aircraft in Canada: following the Empress of Russia into Vancouver to prevent the illicit trade in drugs. Formerly, packets of drugs were dropped from ships into the harbour with buoys attached, to be picked up by confederates.

France has accomplished records that are perhaps less imposing than the crossing of an ocean or the scaling of mountain peaks, but which nevertheless have placed her to the fore as a leader of the world's aeronautic development.

The year 1920 was spent in the successful remodeling of the whole system of aviation. Under a new branch of the national government, an Under Secretariat for Aeronautics, the principle of unity of technical control has been reconciled with autonomy in the administration of the commercial, military and naval branches.

This department, nursed by the parent government through a separate budget, has assisted financially in the establishment of the prodigious net of commercial airways across the land. It is responsible for the preparation of efficient training centers, has instituted pilots' schools, created a national office of meteorology, and is at present seeking not only the betterment of commercial aviation but the encouragement of scientists and inventors who have turned their attention to aeronautics by offering substantial bonuses for improvements to the motor, control of the planes and everything that goes to make up the ship of the air.

It is the ambition of the French enthusiasts to permit one to breakfast in any part of France and lunch the same day in the most distant corner. Travel that requires more than twenty-four hours on the fastest express trains, from the Channel to the Riviera, has already been accomplished between lunch and dinner time. The whole programme of international airways now being worked up by the French department would permit breakfast in Warsaw and dinner the same day in Morocco, ordinarily a voyage by train and boat of four or five days.

A fraction of the progress made in the development of air travel is indicated in statistics compiled by this government de-

(Continued on p. 490.)

"Land of the forest and the lake" as the airman sees it.

The Farmer and His Out-at-Elbows Wood Lot

(A Letter to the Canadian Forestry Magazine, from Mr. H. G. Cockburn, Guelph, Ont.)

WHY NOT TURN EVERY SAND DUNE INTO A CROP PRODUCER?

The photograph shows a stand of 2,000 Scotch pine, eight years old and from twelve to fifteen feet high with diameter averagng over four inches. These trees were about twelve inches high when planted, and were planted by Mr. H. G. Cockburn, of Guelph, Ont., an ardent believer in tree planting.

The protection from fire and the reforestation with young trees is important in certain localities, but I do think a great deal can be done throughout the lower parts of the province of Ontario in educating farmers who are the owners, to preserve these woodlots. There has been an established department throughout the province in existence as long as the writer can remember, for the protection of our fish and game. This has been done through inspectors over stated areas, and which has apparently worked out reasonably well for what it was intended, and I have no objection to the expenditure of that department, but if the province had spent the same amount of money under the same system by having timber wardens established in like manner, my opinion is that $1,000 would have been saved for the province for every dollar that has been saved through the preserving of game, and while there may be some other means of conducting such a department, I would be pleased if you could interest as many men as you can until something definite is put on foot. I will continue to do my part.

I am holding 30 acres on one farm of 150 acres, 60 acres of which is in apple orchard, and I am carefully preserving these 30 acres and keeping some record of tree growth which now runs from about four inches to twelve in diameter, of Oak and Pine. Besides this, having a field of worthless sand hills sprinkled with a few Oak trees, and worthless for general farming, eight years ago I planted 1,000 Chestnut and 1,000 Scotch Pine, and six years ago I planted about 4,000 more Scotch Pine, and this year I have squared out the piece with another 2,000 Pine. The Chestnut I do not consider as being a success, as they appear to get frozen back and have made slow progress besides a great number of them having died off. The Scotch Pine I consider a great success. You will probably be interested in a photograph of these eight year old trees, which you will note are now from 12 to 15 feet high, and some of the trunks now measure as much as four inches in diameter. I also enclose you a photograph showing a top view of the six year old plantation, which represents the face of a sand hill which was worthless for other purposes, and upon which this forest of Pine is growing without the loss of a single tree, and I have followed one root from one of these six years old trees the size of my finger, six inches below the surface for thirteen feet from the tree when it branched, and each branch was then traced about three feet further. These six year old trees now average about five feet high.

I also planted some Locusts which are doing very well, but according to my judgment the Scotch Pine looks like the best proposition.

The Case for Forestry in a Nutshell

The following table prepared by R. D. Prettie, Superintendent of Forestry of the Canadian Pacific Railway Co., and a Director of the Canadian Forestry Association, shows exactly how a decline in forest industries (which means wages paid, capital employed, towns maintained, etc.) has followed the denuding of the main bodies of timber in the Lake States of the U. S. A. and the Northeastern States. From large exporters, most of these states do not today grow more than a fraction of the timber consumed within their own borders. This does not mean that the lands denuded of timber have been turned into good farms, because each of the States now importing possesses abundance of idle and barren land on which timber crops should be growing.

Note the remarkable decline in relative timber producing importance of the first two groups, which have surrendered position to the Southern and Western States.

Percentage of Total U. S. Cut By Groups of States

Year	North Eastern States	Lake States	Southern States	Pacific States
1850 --- ---	54.5	6.4	13.8	3.9
1860 --- ---	36.2	13.6	16.5	6.2
1870 --- ---	36.8	24.4	9.4	3.6
1880 --- ---	24.8	33.4	11.9	3.5
1890 --- ---	18.4	36.3	15.9	7.3
1900 --- ---	16.0	27.4	25.2	9.6
1914 --- ---	9.0	10.5	47.7	19.3
1918 --- ---	7.4	7.8	34.9	25.5

What Happens When a State is Deforested

One of the most striking items in the pulpwood situation in Pennsylvania is the fact that 74 per cent of the total quantity of wood used was imported from outside of the State. This means that the forests of Pennsylvania were able to supply only 26 per cent of the wood used, and that 362,293 cords out of a total of 489,211 cords were brought into the State. Spruce, which comprises 26 per cent of the wood used, was all imported and most of the Yellow Pine, Poplar and Gum was imported. One mill located in the northern part of the State uses Jack Pine almost exclusively, all of which is imported from Canada. Another mill located in the southern part of the State uses only Jack Pine, all of which is imported from the South.

The Pulp and Paper Industry's Stake in Forestry

By Arthur L. Dawe, Secretary Canadian Pulp and Paper Association

Work that takes real grit. River drivers on the Key River, Ontario, operations of the Schoeder Mills & Timber Co. Photo by Leslie B. Powell, Pakesley, Ontario.

Showing how acurately timber can be protographed from the air by special aerial cameras. This shows a tmber area with river and clearing. Hundreds of these pictures are taken and accurately fitted togethr to make a complete phoographic mosaic.

THE Pulp and Paper Industry of Canada—in the East as in the West—is passing through a somewhat trying period, as can be said of practically every industry in this country.

The conditions which brought it about are universal and are not due to any inherent weakness in the structure of the industry nor to short-sightedness or bad jugment on the part of those who control its affairs. It is true that the years 1919-1920 witnessed a very considerable increase in the number of pulp mills in Eastern Canada, particularly in Ontario and Quebec, and that last year and this have witnessed notable additions to the number of paper-making and board machines in these two provinces.

Planned Before Boom Period

Contrary to general belief, however, the bulk of these enterprises were not predicated on the abnormal demand for pulp and paper which developed soon after the war ended and reached its peak in the closing months of 1920. They were in most cases the outcome of plans made long before—in some instances even antedating the fateful summer of 1914—and were founded upon adequate knowledge of the fundamentals of the industry and a confidence in Canada's advantageous position as a contributor to the world-wide demand for such staple commodities as pulp and paper and their numerous derivatives. There is no reason, therefore, to apprehend that when conditions are once again stabilized Eastern Canada will be found to have outrun prudence and prescience in providing for the future. On the contrary, when the disabilities at present imposed on Canadian commerce in these commodities by reduced demand and by the deflated money of our chief foreign competitors are removed, as they will be in due time, there will be a ready and profitable market for all the pulp and paper Canada can produce and an orderly and consistent expansion of the means of production will continue, as in the past, so long as the Canadian forests are able to provide a steady supply of pulpwood.

Investment of $264,000,000.

Canada's pulp and paper industry represents, according to latest census figures obtainable an investment of $264,581,300. (Current estimates place it at between three hundred and three hundred and fifty millions). Of this amount $232,551,227, or 87.5 per cent, is represented by pulp and paper mills in Eastern Canada and $32,030,073 by those in the West, chiefly in British Columbia. The Eastern provinces are represented as follows: Quebec $124,101,154; Ontario, $95,281,040; New Brunswick, $1,208,255; Nova Scotia, $1,208,255. The totals in the two last-named provinces represent investment in the production of pulp only, with five miles in Ontario with a capital investment of $6,703,755 and seventeen in Quebec involving $9,489,520. Ontario has nine pulp mills, capitaliized at $21,575,584 and Quebec seventeen representing an investment of $28,763,850. The investment in combined pulp and paper mills in the Eastern provinces is as follows: Ontario, thirteen mills, $67,001,700; Quebec, twelve mills, $85,487,794.

1921 Will Equal 1919

In 1919—before the era inflated prices—Quebec produced pulp and paper products valued at $52,549,103 and Ontario

$48,683,437. Despite decreased demand and a falling market in 1921 there is reason to believe that when the returns are made up for this year it will be found that they are equal to if they do not surpass those of 1919, which, up to that time, was a record year.

Must Increase Canadian Pulpwood

But, as already indicated, the future of this great industry in Eastern Canada depends altogether upon a continuous and, in fact, an increasing supply of pulp wood at a price which will enable Canada to compete in the world's market. It is with this phase of the future of the industry, rather than with its more purely commercial aspect, that Canadian forestry is chiefly concerned. Unless steps are taken at once to ensure a more reasonable use of our forest wealth than in the past, and adequate provision is made for their replacement by either natural or artificial means, there is bound to come a time when the industries dependent on them will run short of their raw material and cease to expand and to keep pace with the world's constantly increasing demand for pulp and paper. The intelligent application or the withholding of these policies is bound to affect not only Canada's industrial status but also the price that the world consumers will ultimately pay for these commodities.

Lower Cost of Labor and Supplies

Labor and supplies play a large part in logging operations, but th cost of these two factors will not steadily increase. Logging is, after all, mainly a matter of transportation, and the farther from the mills and the more difficult the transport of logs is, the greater the logging cost. Also, as we go farther into the North for our timber, the time it takes to grow trees increases, the trees are smaller and give a smaller yield per acre, making the cost of logging greater. The cost of transporting wood, as logs, the handiest package of fibre we know, is so great that most of it must be borne by rivers. With proper methods of handling our forests and of replacing them by planting the above process becomes reversed and and our curve of costs, while at first rising slightly, owing to increased costs of more conservative logging and the cost of planting, will soon commence to decline because the number and size of the trees per acre will increase and the plantations can be made in close proximity to mills, reducing the distance that the wood will have to be transported, decreasing the cost of logging and fire protection and enabling the employment of machinery for logging which will reduce the number of men. The planting and care of these forests will also give employment to large additional populations.

Pioneering in Forestry

In Eastern Canada the pioneer in forestry progress has been the Province of Quebec, which under Sir Lomer Gouin, established a forest school and forest service. The Hon. Jules Allard, Minister of Lands and Forests, established the principle of cooperation with the holders of timber lands for fire protcetion which has given timber lands in Quebec a security from destruction by fire second to none. Steady progress has been made along lines of conservative forest management and the Provinces of Ontario, New Brunswick and Nova Scotia are following the lead of Quebec.

Co-operation With Mills.

The principle of co-operation wtih private interests, mentioned above, has shown the broad-mindedness of the Quebec Government, and has marked a most interesting development. Instead of tying everything up with red tape and trying to run everything by Government departments, great public works, such as storage dams, bridges and roads have been built co-operatively, that is, the Government has contributed part of the cost, approved the plans, and allowed the works to be carried out by several private companies working together. Fire protection of forests is handled now almost entirely by cooperative associations of timberland holders and the government has placed its own lands under the protection of these associations.

Forest Fire Protection

Another most interesting phase of the sentiment for the proper utilization of the forests on the basis of a sustained yield in Canada has been the interest taken by the great pulp and paper companies. They realized that with their large investments in plants of a permanent character, with towns and villages and often whole districts dependent on them, they must look to the permanence of their supplies of raw material. The first step along these lines was made in 1908 when the Laurentide Co. established a fire protective association to safeguard the forests along the line of the National Transcontinental Railway then building. Two years later this expanded to the St. Maurice Forest Protection Association, which was later followed by the Ottawa, Laurentian and Southern St. Lawrence Associations, which cover nearly the whole of the province.

5,000,000 Trees a Year

In 1908 the Laurentide Co. also commenced to plant trees and now has a nursery covering forty-six acres, is planting a million trees a year, and plans to plant five million per year by 1924. Its example has been followed by the Riordon Pulp & Paper Company, the Abitibi Company, and the Spanish River Company.

Air Craft for Pulpwood Limits

The Laurentide Co. was also the first to use air craft in forest patrol successfully, and for two seasons have carried on aerial reconnaissance and mapping of their timber holdings. Over a thousand square miles were photographically mapped last year, and plans for the coming year call for the mapping of twice that amount. Other companies have since adopted air-craft as part of their enterprise. The use of aircraft makes possible a rapid stocktaking of timber lands at a cost far below that of the same work on the ground. The wide-spead areas—several companies have five thousand square miles of forest—the utter lack of maps, the difficulties of transportation, have all hindered this work, which is of vital importance. Enormous areas have been burnt in the past, and until their size can be determined and a fairly accurate estimate of the amount of timber can be made, no intelligent plan of operation can be prepared.

Under Trained Foresters

Active steps are being taken by the Quebec Government to get the large companies to place their holdings under the management of trained foresters and to co-operate more closely with the Government in operating them for a sustained yield. The establishment of a school for forest rangers is under discussion and the Woodlands Section of the Canadian and American Pulp and Paper Associations are trying to establish an experiment station where new methods and machinery for reducing logging costs can be tried out co-operatively.

It will be seen by what has been said that the preservation and proper use of our forests is of vital importance to the country at large as well as to the provinces whose fortunes depend in large part on those of the pulp and paper industry and that these, in turn, depend upon the intelligent uses of our forests which the Canadian Forestry Association is doing so much to promote.

"PUSH THOSE CLOUDS AWAY."

Toronto, Ont.—Blunt criticism for business men "who sit down and wait for the clouds to roll by" was voiced by John O'Connor, general manager of the Murray-Kay, Limited, in the course of an address.

"Every business man today is confronted with the option of sitting down to wait for the clouds to roll by or to get up and push those clouds away," he said.

Mr. O'Connor made some pointed remarks about men "who put their spare money into tax-free bonds and then go out and play golf or something else, and think that is going to save the situation."

"Such a plan is so ephemeral, and so obviously not the solution to any country's financial problems that I am surprised that men who have built fortunes for themselves can become converts to it," he declared. "Capital cannot exist in a strong box. The only place that capital can keep its life is out in the open. Nothing would be more fatal to any community than the common adoption, by all who had savings, of such a plan."

Timber of Siberia and the Russian Far-East

By Waldemar Toritch, in the Timberman

A BETTER idea of Siberia's size will be gained if it will be mentioned that, roughly speaking, the territory of Siberia is larger than the combined area of Alaska, Canada, the United States and Mexico that the distance between Vladivostok and Petrograd is about 6250 miles, almost the same as between London and San Francisco; that a train leaving Vladivostok for Petrograd would make this run, including all stops, in about ten days, averaging about 28 miles per hour, and that the Vladivostok-Petrograd line is not by far the longest distance across Siberia.

Variations of Climates.

The climate of such a large country cannot be described without subdivision. The Trans-caspian district has all of the characteristics of the extreme South, with cotton, southern fruits, much sunshine, and, in places, very little water, with sand deserts and almost tropical flora. The central part of the country, the Siberia proper, is very much similar to the Inland Empire, and its northern part resembles the climate of Canada. The northeast and Kamchatka resembles some parts of Alaska, and the country to the south of the Amur River is similar to the northern Atlantic states and southern Canada.

Siberia is crossed by a number of mighty rivers. The Ob, Yenesey, Lena, Kalima and Amur are of Mississippi class, deep and navigable for boats of considerable draft for many hundreds and even thousands of miles. The source of most of these rivers and their tributaries lie in central and southern Siberia, some even in Mongolia and Manchuria. Many of them cross the Siberian and Chineses Eastern railroads and act as feeders for freight. The drawback of most of them is that they empty into the Arctic Sea and remain a considerable part of the year under ice. The Amur River is the only one of that class that discharges into the Pacific Ocean.

Navigation in the Arctic Sea has not yet developed to any large extent, but its beginning is already accomplished. The possibilities of bringing by water merchandise into the very heart of Siberia, and to exchange it for timber, grain, hides and other raw materials, has pompted European shippers to send steamers into the mouth of the Ob and Yenesey rivers. Fur, mammoth teeth, gold, are already attracting schooners to visit the Lena, Kalima and Anadir rivers and American traders are numerous in the Russian northeast.

Rivers Serve Twofold Purpose.

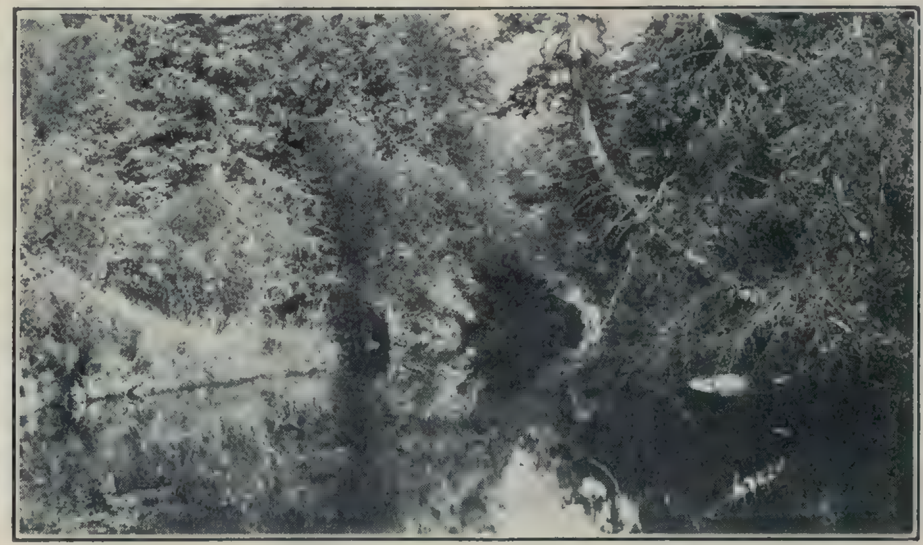
The great Siberain river system forms, practically speaking, the main inland ways of communication in the northern part of that country, even in winter, when the river beds are used as sledge-ways. A little study of their direction will show that all of these northern waterways can be easily connected to form a water route across the whole country. Long before the construction of the Siberian railroad, the Russian government had begun and had partly carried out the work on a new wonder of the world—a Pacific-Atlantic inland waterway across the wildest part of Asia and Europe, consisting of a combination of rivers and canals, connecting Nicolavsk and Vladivostok on the Pacific Ocean with Archangel on the White Sea, Astrakhan on the Caspian, Moscow via the Volga River, Petrograd and Riga on the Baltic Sea, and Odessa and Novorossiysk on the Black Sea. Probably the time will soon come when this work can be reopened, and one can easily foresee what influence a cheap, though slow, transportation of timber, grain, ore and other commodities from the interior of Siberia to the seven seas and industrial centres will have on the world's trade.

Siberia has no railroads of its own. The Siberian, Amur, Ussuri and the Chinese Eastern railroads are only the eastern termini of the Russian European railroad net. They were built, not to serve Siberian needs, but chiefly the needs of Central Russia, and as an outlet of the European Russian railroad to the Pacific

Population Extremely Sparse.

Siberia is sparsely populated. The official figures state it to be less than five-tenths inhabitant per square mile, as compared with 30.9 inhabiatnts per square mile in the United States. The greater part of the population is concentrated along the old mail route and the railroads. The towns are situated either on the principal rivers, or along the railroads, and are small, having from 5,000 to 250,,000 inhabitants, and often are far from being improved.

Siberia is a hilly and mountainous country. Flat lands are found in the west (the Tobolsk and Tomsk provinces), along the border of the Arctic Sea (marsh plains), and the river valleys. Valuable deposits of various metals and minerals are known and quite a number



No, this is not a scene of tropical vegetation. It was taken on the Clearwater Forest Reserve in the Province of Alberta.

"Let the prairie winds blow! My live stock is protected." One of the thriving shelter belts on the farm of Mr. A. Fletcher, Zealandia, Sask.

of mines have been worked to a considerable extent. Placer gold mining in Siberia is over 200 years old; Peter the Great established there the two first iron works; for decades convicts and private miners worked government and private gold, silver, copper, lead, zinc, coal, graphtie and other mines. Oil is known to exist in several places; for instance, on the Sakhalin Island, in the Okhotsk region, and to the north of Kamchatka.

Siberia is rich in all kinds of valuable fur-bearing animals. Polar bear, northern deer and polar fox are replaced more to the south by sable, ermine, black and brown bear, rock-doe moose, red fox, etc., and tigers. Millions of birds inhabit and pass across the country twice each year. Rivers and coast waters are enormously rich in many varieties of fish; and the choicest kinds of salmon, herring, mackerel, cod, etc. Sea animals, such as whales, walrus and seals, live almost unmolested. Crustaceans of many kinds, oysters, clams, are hardly touched by the fishermen, and generally speaking, the whole Siberia does not utilize more than 1 or 2 per cent of its piscatorial resources.

Siberian Forests.

But the great wealth of Siberia lies in the immense Siberian forests. Siberia can be rightly called a timber land, the greatest forest reserve of the world.

It is impossible to give even approximate figures of the Siberian forest area. It surely runs into billions of acres. No exact figures are available, because up to the present time tens of thousands of square miles of Siberian forests have never been visited by a forester or by a surveyor. Siberia has not been properly mapped and many of its landmarks are registered either by eye-sketches, or even by heresay. Only forests in the close vicinity of commercial or industrial centers are known to some extent; the rest is guesswork or imaginatoin.

As the main object of this article is to picture the timbering possibilities in the Russian Far East, it would be superfluous to go into any details in describing the Siberian forests in general. However, some information on the subject will be necessary, because even the far-away western forests are bound sooner or later to have a great effect on the world's timber trade, and in this way they might influence the American timber industry and timber export.

For almost two centuries the English were buying and exporting timber and lumber from northern Russia, from the White Sea (Archangel). Gradually the trade extended eastward to Chesskay Bay and to the mouth of the Petchora River. The next large timber river is the Ob, in Siberia, followed by the Yenesey. Years ago the attention of British traders had been called to the great possibilities of obtaining cheap and good pine (yellow and white), fir, larch and spruce from the immense systems of these rivers. Several years before the world war British and Scandinavian steamers were making attempts to establish regular connection with these rivers. They found the floating ice fields of the Arctic to be the greatest obstacle in their achievement. At the present time a plan has been worked out to patrol the ice fields by hydroplanes, attached to the lighthouse on the Yalmal peninsula, reaching out far into the Kara Sea; the lighthouse to report the position of ice to the steamers. Such a lighthouse is already erected, and is equipped with a powerful wireless station.

Woods Eventually Will Find Market.

The appearance of the western Siberian wood on the European market is bound to have an effect on American timber trade. Previous to the war Russian White and Baltic Sea timber was dominating the British timber trade. It does not make any particular difference as to what kind of government will be next and permanently established in Western Siberia. This government is bound to be poor and in need of money. The easiest way of obtaining it would be to sell timber, or by granting concessions. Britishers are already obtaining timber concessions in the northern part of European Russia. The Ob and Yenesey rivers are not far from British centres of timbering in the Russian north. They are also nearer to the European consuming centers than the American export ports, especially those on the Pacific. Siberia has always been noted for its cheap labor, and this cheapness, combined with the low royalties, no port dues or other taxes on the Ob and Yenesey, and cheap steamer freight on European waters, not only outbalance the difficulties of navigation in the Arctic, but also extend the market for this northern Siberia timber to Germany, France and the Mediterranean Sea. This trade will also be stimulated by the possibilities of obtaining Siberian raw products in exchange for manufactured goods.

Amur River Region.

The Amur River region is bound to become the center of Russian timbering. The Amur River system drains a territory of over 760,000 square miles, and affects economically almost twice this area. This river takes in the water from the greater part of Manchuria, of eastern Mongolia, of a considerable part of the Transbaikal province, the whole of the Amur province, and of the main part of the Maritime provinces.

The total length of the Amur and its tributaries is nearly 40,000 miles, of which over 11,300 miles are navigable for boats and steamers; over 14,970 miles are suitable for rafting purposes, and over 5,500 miles are smaller streams. These figures are changeable. A great many streams are not classified as navigable, not because they are not such, but because there is nobody to navigate them. The same refers to streams suitable or unsuitable for rafting. A great number of them can easily be made to raft or float down timber.

Seventh Longest in World.

The Amur River is formed by the conflux of the Shilka and Argun rivers. From this point down to the Tartar Strait, the main srteam is 1532 miles long. Together with the Argun River, it is the seventh longest river in the world. In its sources, the river has the character of a swift mountail stream, though navigable for a few hundred miles. Towards the Zea-Amur watershed it becomes a quiet broad river, at places as much as five and six miles wide, and runs through marshy lowlands at a speed of about four miles per hour, with an average depth of about ten feet, and from two to three feet of water on the numerous shallows. The fall of the river water level is a follows: At Pokrovka it is 1180 feet above the sea level; at Blagoveshtchensk, 360 feet, and at Habarovsk, 90 feet, a total fall of 1090 feet. The lower Amur, from Habarovsk to the mouth of the river, is 588 miles long. Its width at places is 1.5 to 2 miles. It forms many lakes and receives water from others. The current becomes slower; the average depth greater, with only a few shallows not less than 14 to 16 feet deep, and for some distance from its mouth the river is deep enough to accommodate the biggest ocean going vessels.

MAKE FORESTRY A PUBLIC ISSUE.

Mr. H. R. MacMillan, of the H. R. MacMillan Timber Export Co., Vancouver, in an address before the British Columbia Forestry Convention at Vancouver, declared that the timber industry was basic, and that the resources were being used up very rapidly, while very little attention was being paid to the necessity of reproduction.

"We must force upon our governments the necessity of a square deal to our forests," declared the speaker. "The policies of the government in regard to forest fire prevention, and more especially to the problems of conservation and reforestation are not aggressive. Immigration, railways and the problem of remaining in office engage their attention, while the greatest resources of the country are being rapidly consumed, or, at least, deteriorating in quality to such an extent that there is grave danger for the future."

Climate and Tree Growth of Mackenzie River Oil Region

(From a Bulletin of Canadian Institute of Mining and Metallurgy, by Dr. E. M. Kindle.)

Although the new oil-district lies in the latitude of southern Baffinland and south Greenland, it has a far more genial climate than its latitude would suggest. The gardens at the trading posts in this part of the Mackenzie valley afford a good variety of the more hardy vegetables. Potatoes of excellent quality and good size are raised as far north in the Mackenzie valley as the Arctic circle. The nearly continuous sunshine of June is the great factor in the exceedingly rapid development of vegetation. Mr. Chas. Camsell, who has a more intimate knowledge of the climate on the Mackenzie valley as a whole than anyone else who has written on the subject, states that, "in general it may be said that any point in the Mackenzie basin has a milder climate than any corresponding point of the same latitude in Northern Manitoba, Ontario, or Quebec.". The relatively warm summer-climate of the Mackenzie valley may be ascribed chiefly to its remoteness from the chilling influence of Hudson's bay, and to its low average elevation. Most of this great lowland is less than 500 feet above sea level, while much of the northern half of Alberta immediately south of it lies 2,000 feet or more above tidewater. Warm air-currents from the Pacific may also be a factor. Ripe red raspberries were seen on August 7th at Bear mountain, which is about 40 miles from the oil-well. Blueberries were a feature of the writer's camp fare from the first week in August to the end of the summer. The writer spent the latter part of August and the first ten days of September in 1919 in the Wrigley district. At river level the first frost came on September 1st. At Simpson the first notable freezing of the season of 1919 occurred on the night of September 25th.

Physical Geography.

Both the Peace and the Athabasca rivers flow in valleys deeply incised in the nearly horizontal Cretaceous shales and sandstones of the Alberta plateau. The traveller taking the Peace river route to the new oilfield, passes for several miles along one stretch of the river between deep canyon-like walls of sandstone. In scenic beauty this canyon ranks with the great canyons of the continent. The sharp turns of the river, which has cut its valley from 700 to 800 feet through the sandstone and shales, always brings into view some new and striking combination of cliff, spruce-covered slope, and cloud-rimmed sky. Further down, the step walls of the river drop back and leave a broad, nearly level, valley bordering the river.

Photo by courtesy Geographical Review.
Winter travel on the Athabasca River

A heavy growth of spruce forest borders the Peace and Slave rivers everywhere. This forest extends northward to the delta of the Mackenie. The timber, of course, decreases in size toward the north, but it is everywhere large enough for constructing cabins.

FORESTRY AS A PUBLIC CAUSE.

"I appreciate very much the new and attractive Forestry Magaine. I wish that my neighbors would take an interest and become members for the good of the cause."

EDWIN MOORE.

ON PLANTING TREES.

"Only God can make a tree" said the poet. Yes, but almost anyone can plant a tree, and everyone who plants a tree of the right sort in the right place does a public service."

—"Regina Leader."

The "Movable Lookout Tower" soaring above the stationary Lookout Tower. A unique aerial photograph taken at Norway House, Lake Winnipeg, where the Dominion Forestry Branch has a forest patrol staff. Picture by courtesy, Dominion Air Board.

The Use of Explosives in Planting Young Trees

The blasting of ground, where either fruit or shade trees are to be planted, has been extensively practised for several years in all parts of Canada.

Millions of trees of all varieties have been planted in ground prepared by the use of explosives, and there are hundreds of the best Orchadists who testify that the slight extra expenditure is repaid manifold in increased production.

Directions for Use.

The soil sould not be wet at the time blasting is done. Indeed the drier it is the better, because if the earth is quite damp, the explosion may cause it to pack and thus defeat the object in view.

For this reason the work is best done in the early Autumn, because then the subsoil is more likely to be dry. If the blasting is done in advance of the time of setting the trees, the ground is left without further attention until planting time.

The object is not to do away with the use of the spade, but to make the digging easy, to mellow the soil and to furnish ample room for root development. The charge should not be placed and tamped in such a manner as to shatter the soil creating a porous water-absorbing condition in the subsoil that protects the tree against drought, which saves much loss during the subsoil that protects.

When the places for trees have been marked, punch or bore about 30 inches in depth. A satisfactory tool for this purpose is a heavy subsoil punch, which is made by sharpening one end of a 1½-inch steel bar, which should be from 3 feet to 3½ feet long.

The punch is driven to the desired depth with a sledge, and then, by hitting it one or two blows on either sides, it will be loosened and can be easily withdrawn. A 2-inch earth auger may be used, but of course this makes the work slower.

Next cut off a piece of fuse not less than 3 feet, and crimp a cap onto one end with a cap crimper. Insert the cap with the fuse into the explosives and tie securely. It will be well to experiment with a few holes to determine the size of charge required, because in some soils half a stick of explosive will be ample, while in very hard subsoil a stick will not be too much—you can judge as to this fairly well by the use of a probing rod made from a light iron bar or by visible effect.

When the charge has been placed in the hole put in enough earth to cover the explosives 6 or 8 inches, tamping lightly, using a wooden tamping stick. Then ignite the fuse and retire to a safe distance.

When ready for planting remove the earth to sufficient depth to insure that no "pot-hole" is left from the explosion. If this should remain unfilled the earth might later on fall away from below the roots of the tree and thus injure or even destroy it.

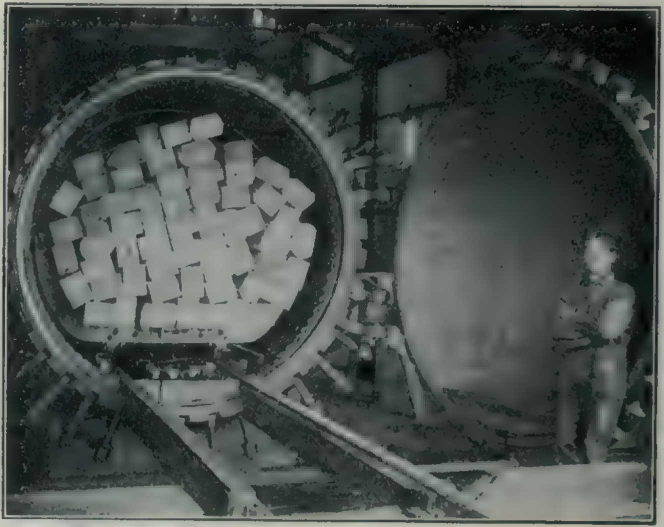
In planting the trees they should be placed little, if any, lower than they were in the nursery rows, and the best of the soil should be saved to put immediately under and around the roots.

The Battle Against Rot

How Creosoting Railway Ties gives Three to Five Times Longer Life at Double Cost. A Great Factor in Conservation of Wood Resources.

Canada's rapid railway growth—thirty thousand miles now, compared with half that amount twenty years ago—and the increasing cost and decreasing supply of good ties, has attracted the attention of the wood preserving industry to the Dominion. Forestry experts claim it takes sixty years to grow a tie, and that we place it in the track to rot out in from five to seven years, whereas it would give from eighteen to twenty-five years' service if preserved, or treated, before being used.

The recent completion of the new C.P.R. tie treating plant at Sudbury, Ontario, and the probability of a similar undertaking by the Canadian National in the near future gives special interest to the following article: The information and the picture are by courtesy of the Canada Creosoting Company.



A retort filled with railway ties ready to be treated with creosote under vaccuum.

On this continent in 1885 only 120,000 ties were treated out of a total of 50,000,000 used, while in 1912 about 30,000,000 were treated out of about 150,000,000 used. In other words, only about 1/400th part of the ties were preserved in 1885, while in 1912 1/5th of all the ties used were treated. In Canada alone in 1910 practically no treated ties were used. In 1911, 200,000 ties were preserved before being placed in the roadbed. This was 1.4 per cent of the total number used. Last year about 2,500,000 ties were treated, or 10 per cent of the total number used This shows that the Canadian railways have commenced the battle against rot.

Rot is the chief cause of failure of timbers such as ties, paving blocks, piles, etc. It is the breaking down of wood fibre that is caused by the growth of small plants organisms known as fungi, which are usually carried by the wind, alight on timber and grow, sending microscopic threads or rootlets into the timber. These organisms live on the timber as food, causing the eating away or breaking down of the wood fibre.

Certain amounts of each of four things are absolutely essential to the existence of these fungi; namely, air, moisture, heat and food. Take away entirely any one of these four, and the fungi cannot live. The timber cannot be protected from the air except in occasional instances, such as piles that are entirely submerged, in which case the timber needs no other protection from fungi, but may be exposed to teredo attacks.

It is also difficult, as a general rule, to protect the timber from moisture, but where it can be so protected the growth of the fungi is stopped. This is shown, for instance, by the excellent condition in which one often finds very old timber in interior construction.

If one could keep timber at or below the freezing point—say, in a cold storage plant—fungi could not live; but from the practical standpoint it is impossible to protect timber from heat.

Killing the Food Supply.

Therefore, the only thing that can be affected to destroy the growth of the fungi—the only one of the four essential conditions that can be removed—is food. The fungi have only the wood figre for food, and if that food can be rendered poisonous, the wood will be preserved against their attacks. This is done by treating the wood with a highly antiseptic fluid.

To properly treat a tie in order to preserve it against decay requires a modern treating plant of considerable cost and complexity. In 1885 there were only three of these plants in operation on the continent, while there are now over one hundred such plants in existence, with an aggregate capacity of over 100,000,000 ties a year. In Canada we have but five of these plants, all built within the last four years, with an aggregate capacity of approximately 4,500,000 ties per annum. These plants are located at Sydney, N.S.; Fort Francis, Ont.; Trenton, Ont.; Transcona, Man., and Vancouver, B.C.

Up to the present only wood block and ties have been treated at Trenton, but it is expected to treat timber for station and outdoor platforms, switch ties, dimension timbers, decking, flooring for docks, bridges, fire halls, warehouses and heavy manufacturing plants, crossing planks, fence posts, signal poles, snow fences, piling, mine props, telegraph and telephone poles, cross arms, mine timbers, tie plugs, wooden pipe, and all material for breakwater and marine work.

The first ties ever treated in Eastern Canada from Canadian timber were creosoted at the Trenton plant recently for the Toronto, Hamilton and Buffalo Railway. The only woods used so far have been beech, birch and maple for ties, and southern yellow pine, and Norway pine for wood blocks, but spruce, tamarack, fir, hemlock and other woods will probably be treated later on.

Special attention will be given to the treatment of mine props, as timbers for use in mines decay very readily, owing to ideal conditions of moisture and temperature for fungus growth. Much of the failure of mine props now attributed to breaking and splitting is due primarily to rot. This can be prevented, and the original strength of the timber maintained, by creosoting or otherwise preserving it. The creosoting of mine timbers is not so expensive as some other forms of creosoting, because it is not necessary to obtain such great penetration. The uniformity of temperature and moisture in mines, and the lack of exposure to the direct rays of the sun, result in no checking taking place, so that it is not necessary to get such deep penetration. And much lighter treatment than is given other timbers will therefore prove satisfactory. But this does not necessarily mean that any merely superficial treatment is sufficient.

Treated Ties Treble their Life.

The difference in strength between untreated and treated ties and timbers, except in the case of those treated with heavy oils which protect the timber from excessive moisture and add to its strength,

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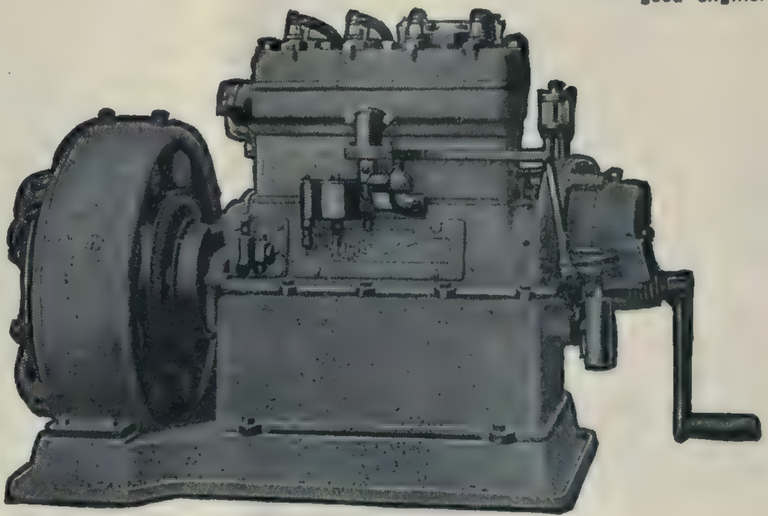

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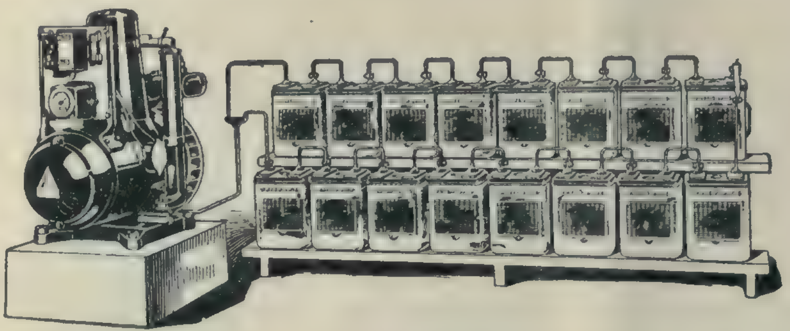
is so slight as to be of no importance. This assumes that ties and timbers are properly treated and not injured by steaming or excessive heat during treatment. The drier that wood is kept, in ties and timbers, the stronger and better service they render.

The very great value derived from the treatment of wood is not only the prevention of the rot which makes the wood useless. The treatment maintains the original strength of the timber, especially in the case of ties treated with oil, and causes it to resist mechanical abrasion and wear longer. Furthermore, when ties are properly seasoned before treatment and preserved with creosote oil, the oil resists moisture and prevents the ties from becoming soft and spongy.

The added life due to creosoting depends upon the quality of treatment, and upon the kind of timber and the manner in which it is used. It is only fair to say, however, that creosoted ties will last from three to five times as long as untreated ties, while the cost of treatment does not double the cost of the tie. Therefore the great saving in the use of treated instead of untreated ties is apparent. This saving is even more pronounced in the case of other timbers.



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This space devoted to the cause of forest conservation by

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WINDSOR MILLS, P.Q.

CIVIL AVIATION.

(Continued from p. 481.)

partment, showing that during 1920 close on to a thousand aeroplanes were turned out by French shops. The number of passengers carried in twelve months was 7,000, against 960 in 1919. Traffic in merchandise followed the same rate of progression, increasing 850 per cent within a year—although the period was really supposed to be one devoted to special study and reconstruction. The figures have been eclipsed this year.

Flying Pigs a Reality.

Not only passengers are carried on these air lanes, which French planes have extended over most of Europe. Strange cargoes pass through the air these days. For instance, says the writer:

Flying pigs have now become an actuality, although they did not take kindly to the air. A crate of porkers was sent from the French capital to Croydon recently, where the distinguished travelers, the first of their race to realie the ambition to fly, were bustled into a taxicab and rolled to the national British stock show.

Millinery, a cargo of lobsters, boxes of early strawberries, trays of jewels and watches, and even cases of rare wines and champagne have been included at times among the freight shipments handled by air, for in addition to the fact that the fragile goods are less roughly handled in their flight by air than by train, there is also far less danger of theft than in the open baggage rooms of the ralway station.

In the operation of all her airways, we are told, France uses every precaution of safety. While in December, 1918, the government controlled only four flying centers, and each one very incomplete—

There are now dozens of these air ports scattered over the country. Where foremrly the pilot had to trust to luck when attempting a landing, he can now circle down over a field as level as a table, where he can be sure of landing his passengers and freight in absolute safety.

A large number of main air ports, fitted with hangars and workshops, control their chain of intermediate posts and aid stations. Flares visible at a distance of 25 miles are in use on the principal landing grounds, and two flames for which visibility at a distance of 94 miles is claimed, are being installed this year to guide airmen across the waters of the Mediterranean. A score of weather stations, located at these air posts, exchange reports four times daily, and a pilot before taking off knows well the weather to expect before effecting his next landing. In this way planes can be routed around, above or below storms that are known to exist along "the right of way."

As a result of these precautions fatal accidents have been few.

MONTREAL-QUEBEC RECORD.

Quebec.—Probably the fastest trip ever made by aeroplane between Montreal and Quebec was that recorded by Mr. J. H. St. Martin, one of the pilots for the Canadian Aerial Services, Limited, Montreal, who flew one of their Curtiss machines from the aerodrome at St. Lazare, near Montreal, covering the 150 miles to Quebec in 100 minutes, or at an average speed of a mile and one-half a minute. On this record flight there were no passengers in the double-seater, and the pilot was assisted by a stiff breeze, which added materially to the speed of his machine. It is claimed by Mr. B. Daville, of the Canadian Aerial Services, Limited, that the flight easily made a new Canadian record for the distance, and one that is not likely to be duplicated for some time, owing to the unusually favorable circumstances. Mr. St. Martin was under contract to fly to Quebec in order to take a series of aerial photographs of that city for a railway company. Owing to the amount of paraphernalia necessary for the aerial photographing work, the photographer did not join in the flight, but took the C.P.R. train to Quebec with his cameras and other outfit.

ROMANTIC TALE OF A FORESTRY POSTER.

The Forestry Branch of the Department of the Interior, issues fire warnings in about sixteen different languages and dialects. These notices are nailed to trees along trails and at camping places, and, according to all who have to do with the forests, they constitute one of the greatest factors in forest protection. They are always "on the job" reminding all who travel in the forest of the need of care of the existence of a wonderful system with fire. Many Canadians are unaware of writing known as Indian syllabic script, an invention of a missionary and used all over northern Canada by the Indians. The Indians learn it very quickly, and it is read and written by many Indians who never saw a white man. While the same script is used for all Indian languages, each Indian can read only those books or communications written in his own language. It is a misdemeanor to pull down or deface a fire notice and this law is carefully enforced by the Dominion fire rangers, and is generally observed all through our Canadian forests. Sometimes a porcupine will eat one for the glue it contains, and sometimes a moose or a strayed steer will lick off the ink because of its salty taste, but, generally, men and animals leave them alone. One conscientious ranger, however, recently had a problem to solve about posters. One poster, printed in Indian syllabic, was neither torn down or defaced, but it was partly detached and, on turning it over, the back was seen to be covered with syllabic writing done with the juice of some herb. The ranger could not read syllabic, and fearing this was a message inciting Indians to disregard fire laws, or making light of authority, he took down the poster and showed it to several leading men of the band of Indians, who smiled in a curious way but professed their inability to read it. Sure now that something was afoot, he sent the suspected document to Ottawa. The translator also smiled as he read it, and then translated the characters into a love letter and proposal of marriage from a bashful Indian swain, who being without writing materials had taken this means of addressing the object of his affections. The translation was duly returned to the conscientious fire ranger who, much relieved, danced at the wedding, and all lived happily ever after.

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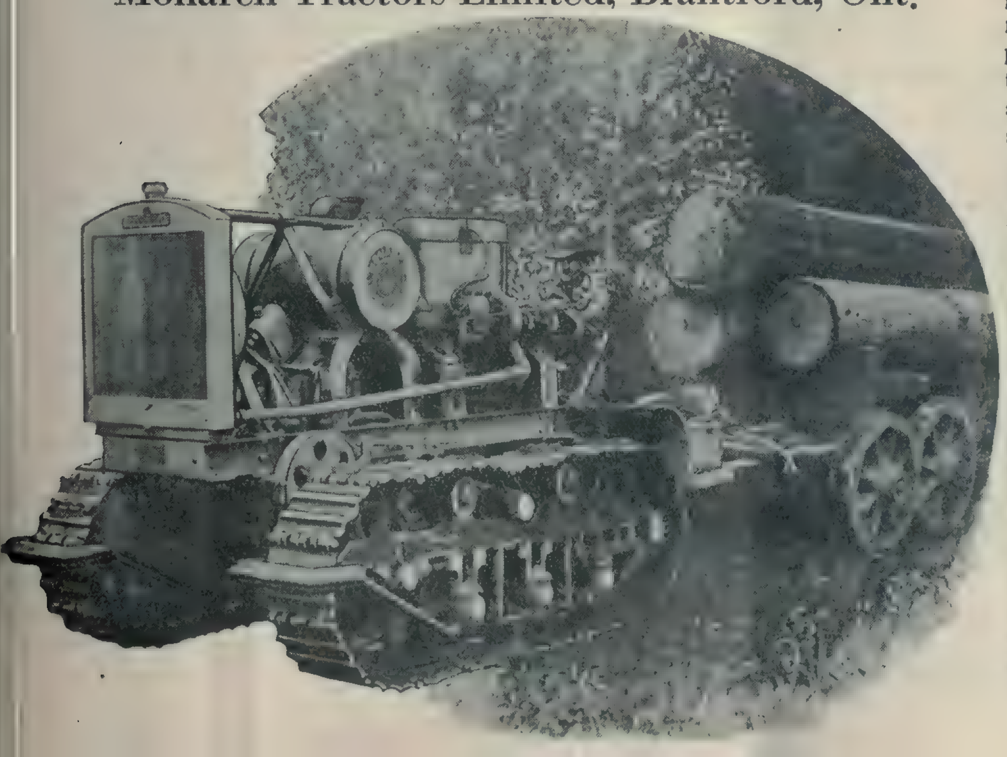

The Motor Truck in Forest Operations

In a Substantial Bulletin on "Motor Truck Logging Methods" issued by the University of Washington, Mr. F. M. Knapp gives the following as his conclusions:

"At present, the possibilities for the use of the motor truck for logging are just beginning to be realized. What effect their use will have upon the future methods of logging remains to be seen. It is certain, however, that the advent of motor truck transportation will have a marked effect upon the science of forestry and will bring about a closer utilization of our timber resources.

The motor truck and the portable band mill seem to furnish a combination which will do away with the old wasteful circular mill because it supplies the cheapness and efficiency of railroad transportation and is applicable to small and scattered tracts and to stands of low-grade lumber. The fact that the portable band mill may be moved for a cut of a million feet assures adaptability. This is not only an industrial advance but also a silviculture advance in that it affords the possibility of cuttings at frequent intervals without greatly adding to the cost.

"A closer utilization of our present stands of timber may be practised by the use of the motor truck. In the northwest, only the larger material is taken from the forest, leaving a large amount of good timber on the ground in the form of poles and piling and chunks too short to be made into saw lumber but from which high grade ties can be made. The truck, in connection with a band mill, will furnish means of utilizing this present waste at a profit to the operator.

"The motor truck will be a valuable aid in the working out of a sound national forest policy for the proper use of our timber resources so that the timber will be utilized to the greatest possible extent and at the same time methods taken to provide for the perpetuation of the forest for future generations. This suggests a way of opening the timber for the market on some of our national forests. Most of the government owned forests are situated in more or less rugged country back from the regular routes of travel. The timber on a great many of these forests is over-mature and should be cut but at this time it is inaccessible. The problem confronting the country is how to make it accessible.

The plan for opening these forests is to build permanent concrete or asphalt roads from the nearest commercial centers thru these tracts taking into consideration the aesthetic value of the location as well as the possibilities of logging the timber from them. The timber, then, is to be taken out, under some silvivultural system and under government supervision, by motor truck operators who build their own roads from the nearest concrete road to the timber to be cut. Under this system of management, the state and federal governments pays a part of the expense of building the permanent road and the operator pays a sum for the use of the road by being taxed additional stumpage.

The system of management has many advantages. In the first place, the mature timber will be logged, the older decadent

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material coming out first, in small bodies and at the same time care being taken to reproduce a new stand. The total area is divided so that as the timber is logged in rotation a continuous cutting will be assured. Due to the use of the trucks and on account of the timber being cut in rotation, the fire danger will be greatly lessened. In case a fire gets beyond control, the roads thru the forest make an excellent way to bring in men and supplies to fight the fire. In this way, a fire is readily accessible in a few hours where formerly it took perhaps several days to organize the fire fighting party and reach the scene of action. The concrete roads themselves make good fire lines. By means of the good roads, the forest is opened to campers and tourists each of whom pays a small sum as they enter the forest to help pay for the cost of building the roads and to provide funds for more extensive highways. In this way the forest is open for the timber, the best methods of utilization and forest regeneration are practised, fire hazard is reduced, and the area is opened as a recreational ground so that the greatest possible value is obtained from the tract.

"A great many other uses of the motor truck for logging and scientific forest utilization are being recognized, as example, for transporting pulpwood, veneer stock, cordwood, rosin and turpentine, and other forest products. Suffice it to say that this method of transportation has found a place in the industry and is here to stay. Its value has been recognized beyond doubt and in the future will play an important part in the further development of this country.

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A Forest Policy For Canada

By Edward Beck, of the Canadian Pulp and Paper Association.

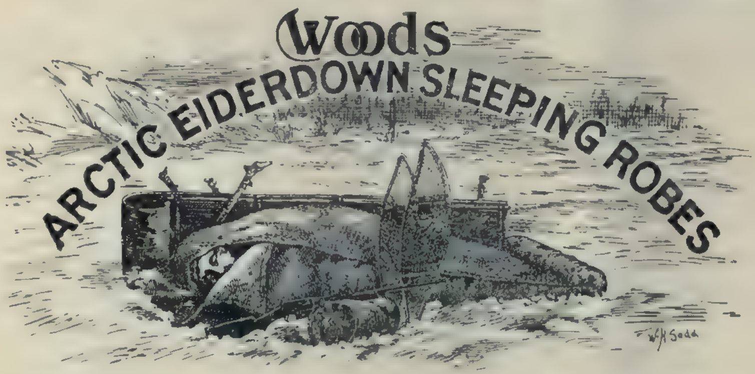
The Canadian forestry problem as I see it, resolves itself into two divisions, the one Federal the other provincial. The Federal Government, as the owner of thirty-nine forest reserves in Western Canada, covering an area of nearly 35,000 square miels in British Columbia, Alberta, Saskatchewan and Manitoba, has a problem in forest administration all its own to conten dwith. The fact that the Western provinces have not relinguished hope of being able to persuade the Dominion to surrender control of their natural resources and to place them in this respect on a par with Eastern Canada, raises a question about the permanency of any forest policy that may be applied from Ottawa to the Western provinces and until that issue is settled there must necessarily be some uncertainty no matter how pressing may be the need for a fixed and determined line of action.

Furthermore, in addition to its responsibilities as a forest-owner, the Federal Government, through its control of all matters affecting Canada's external trade, is in a position to regulate, to some extent, the rate at which our forests in general are being consumed. It can do this through the application of the tariff laws to exports of timber if it so desires. There are thoughtful students of economic conditions in Canada who believe that it would be a wise and prudent course, and eventually a very beneficial one, if an export duty were to be applied to all our outgoing timber, particularly pulpwood. They argue that such a tariff would help to preserve our forest resources, stimulate the industries dependent upon them for existence and enhance the value both of the wood and its products in our foreign markets.

When it comes to the Eastern provinces, more particularly Ontario, Quebec and New Brunswick, a logical forest policy would appear to be more easily definable. In these provinces the Crown lands are controlled by the local governments whether they are under license or not. These provinces are in a position to adopt and apply whatever progressive policies they please to their holdings. Some of them have already made a good beginning. The foundation of successful forestry, as of all successful enterprises, is knowledge. What is needed in all of our provinces is first of all, an accurate and complete survey of their forest possessions. There is too much guesswork and too much broad generalization at the present time and no real progress can be expected until this vitally necessary work is accomplished.

Next in line should come a strengthening of our forest personnel. Canada, in comparison with Scandinavia, is pitifully weak in this respect. Not so much in point of quality, but in point of numbers. We have, without question, some of the most capable foresters in the world, men whose names carry authority in Europe as well as in America, but their staffs are inadequately manned. They are given insufficient support and are not permitted to organize their work on the scale necessary to ensure the best results.

Co-related to the question of an adequate forest service and perhaps preceding it in importance is that of forest education. We haven't nearly enough nor capable enough institutions for the training of forest engineers, rangers and forest



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workers generally, and until we do have them and until we make it an object for more of the right type of young men to adopt forestry as a profession we shall continue to lag behind other countries.

Given a knowledge of the fundamentals, an adequate forest service and the proper means of training forest workers, the other problems which confront us, such as fire protection, the application of proper cutting restrictions and the adoption of the best means for reforestation, would be in a fair way of being solved. Rational cutting regulations, upon which so much dependence is placed by the foresters of Sweden and Norway, are a matter for provincial consideration in each case. They certainly ought not to stop, as they now do, at the mere fixing of an arbitrary diameter limit for the felling of trees. They should take into account other factors which go to make up the problem of how to obtain a sustained yield from a given forest area. They should be adopted only after joint consideration by the authorities and by the licensees and, once agreed upon, they should be enforced with rigor and by the co-operative effort of all. It is here that adequate forest service would justify its cost.

When it comes to the question of dealing with cut-over woods and taking measures to ensure a regrowth, there is a diversity of opinion even among experts as to the best methods. It becomes, however, largely one of local conditions, timber species, natural reactions, nature of soil, etc. Artificial replanting may be advantageously applied in some instances, while in others it may be unnecessary or entirely impracticable, as in those cases where Nature can be depended upon to do the work unaided. A properly trained and adequately manned forest service should be able to deal with it, the adequacy of the service implying, necessarily, the maintenance of nurseries, experimental stations and other equipment on a reasonable scale. All this, of course, would cost much money. But it would be money well invested and would give good returns. Instead of the comparatively meagre provision they now make for forest purposes, the province of Quebec, Ontario and New Brunswick could well afford to set aside at least one-half of the revenues they derive from the Crown lands for the purpose of proper forest administration and development. In this way they would not only go on increasing their revenues from these sources indefinitely every year, but they would be building for the future, creating new capital for the State and contributing to the permanency of an industry in which Canada has an opportunity of leading the world.

In respect to privately-owned forests, these observations are also nearly all applicable. There are private forests in Scandinavia, particularly in Norway, which, as a result of careful cultivation in years gone by and at present, yield their owners a highly satisfactory income with all the regularity of a coupon-bearing government bond and without appreciable impairment of the original capital. Private forests over there have been developed along the line of securing a maximum annual yield from a given area without diminishing the extent of the original stock and many of the owners have achieved entire success. It costs money to carry on the operations, of course, but in spite of the heavy capital outlay the work is declared to be on an economically sound basis. It is a fact, too, that in

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Scandinavia the banking interests in extending credit are inclined to give more consideration to the forest possessions back of an industrial plant and the way in which they are being exploited than they are to the physical plant itself or what may be the immediate demand for its products. In other words, the Scandinavian forests have as great or a greater potential credit value than buildings and plant, which are looked upon in this country as more tangible assets.

There are some Canadian companies, of course, that have the right idea and are doing just as progressive work as is being done abroad, although most of it is of more recent origin. These are the companies which are carrying on their own reforestation programmes, building up forest reserves for the future and in as close proximity to their industrial operations as it is possible to get them. It has taken vision and much courage for these companies to adopt and carry out such a policy in the face of the prevailing skepticism as to its economic soundness and of lukewarmness on the part of the financial authorities. But I am confident, from what I have seen abroad, that the future will amply reward their enterprise. When those who, having the opportunity, have made no provision for the future, are faced with the necessity of going great distances for their wood supplies and are obliged to pay famine prices for them, these far-seeing companies I have mentioned will be getting their wood at a cost and in such quantities as will not only give them a tremendous advantage in the competitive field but will yield them a handsome return on what at present some regard as merely a severe drain upon their resources.

Of course I am not suggesting that any company or any individual can afford to restock the Crown limits. That would be impractical and financially impossible. So long as the Crown retains the title to the lands and the power to dispose of them as it will, so long must the Crown assure responsibility for the perpetuation of the forests on them. This, however, does not bar co-operative effort on the part of the Crown and the licensees to that end.

WE AWAIT YOUR DECISION!

Members of the Canadian Forestry Association were requested in the September issue of the Canadian Forestry Magaine to inform the Association's Secretary, 224 Jackson Building, Ottawa, whether or not they approved of the plan, as announced, for an essay competition covering all of the school children of Canada on the subject of the farm wood-lot and what can be done to make it an asset to every Canadian farm. Many of the members have already written in expressing strong approval of the competition and of the plan of action that would naturally lead out of it, but we want to hear from **every** member. Will you not tear off the coupon below and send it in to the Association offices by the next mail.

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I approve of your essay competition as described in the September issue.

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GREECE AWAKENS TO HER FOREST NEED.

Much will have to be done in Greece as regards the restoration and rewooding of the mountains. On the slopes of many mountain chains there are huge stretches of formerly wooded ground which have been reduced to the condition of waste land or entirely denuded through abuses in exploitation or in grazing and through fires. The question of re-planting was the object of a special law, passed on May 3, 1918, which provides for the setting up in each commune and 4 members: officers or private owners. These commissions will be nominated to specify the areas where re-planting or protection is necessary. The protection of the ground may consist mostly in forbidding or regulating grazing and exploitation. The work of re-planting will be carried out either by the proprietors or by the State, after the purchase of the ground by agreement or by expropriation.

Two new laws passed by the Parliament December 26, 1918, will allow of several important improvements being realized soon.

The first of these laws regulates the method of management, as regards exploitation, of forests belonging to estates, communes, public and private establishments, as well as of those under litigation and unalloted, it revises and codifies the existing customs with regard to rights of usage; especially the gathering of firewood by the peasants, giving the local authorities the right of determining the enforcement of the provisions; and in connection with taxes, it slightly modifies some of the tariffs at present in force.

The second lays the foundation for a new forest service organization. At first the personnel will consist of 20 inspectors, 120 district inspectors, 50 chief rangers, 150 rangers and 850 guards. The staff will be recruited from the ranger schools. In order to fill the large number of vacancies which already exist, the law provides for the engaging of returned soldiers, preference being given to non-commissioned officers, who will be called probationers, and who will not receive promotion until they have taken a course at the ranger schools. A measure of this kind is not practicable in so far as the higher officials are concerned, and it will be some years before the Forestry School at Athens will be able to graduate enough men to properly equip the service.

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Trees to "Anchor" Sand

(*Correspondence in the Soudan Overseas Mail*).

Sir,—In reply to Mr. James White, who writes from Ontario to "The Over-Seas Daily Mail" to ask whether any of its readers know of a tree or plant that will take firm root in sand to prevent it from drifting, I would like to say that the common bramble is used in Denmark for this purpose, and the use must be of long standing, as there is a reference thereto in Boswell's "Johnson."

Penmaenmawr. Percy Thompson.

Sir,—May I point out that the difficulty with shifting sand mentioned by Mr.

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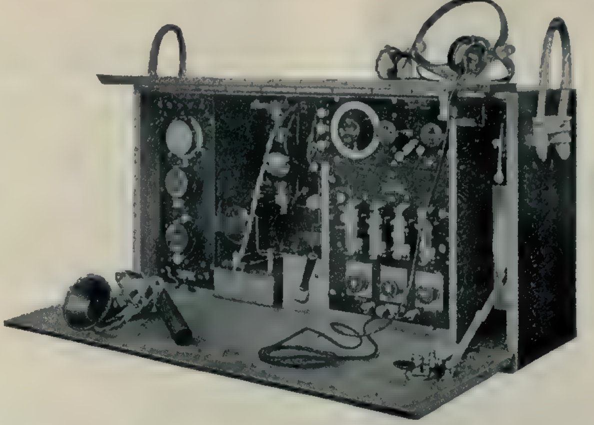

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James White, of Ontario, is not entirely without precedent? Considerable trouble with shifting sand was experienced some years ago on the banks of the Suez Canal. The problem was successfully solved by the extensive planting of several varieties of tamaracks, which take root in a very small depth of sand, and which were intermingled with herbaceous plants such as the orach and the alfa.

It has been found that Bengal fir trees, poplars, mulberry trees and sycamores have flourished well and have prevented the encroachment of the desert sands driven up by the wind.

John O. Forward, B.Sc. (Eng.)
2 Commercial Buildings,Byfleet, Surrey.

Aeroplane in Forestry.

Ottawa.—The value of the aeroplane in forest fire prevention work and the need for greater activity along these lines were emphasized by Ellwood Wilson, M.C.S.F.E., manager forestry division, Laurentide Company, Ltd., Grand Mere, Que., who spoke at the luncheon of the Engineering Institute of Canada in the Chateau Laurier here. No development of recent years had rendered such aid to the work of the forestry engineer as had the aeroplane, and Mr. Wilson wished to express his appreciation of the work done by the Air Board in this regard. The work of the Air Board had been uniformally excellent.

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A Test of Wooden Shingles as a "Fire Menace"

A Resolution Passed at the Annual Meeting of the Dominion Fire Prevention Association.

Resolved,—That it is expedient an impartial committee be appointed by the chairman and secretary of this association to examine, test and report upon the various kinds of roof coverings ordinarily sold in Canada, with reference especially to:

(a) Combustibility.

(b) Qualities to communicate fire to other buildings.

(c) Cost both for material as sold in bulk and for placing in position on roofs.

(d) Durability and cost of maintenance.

(e) Appearance on roofs.

(f) What treatment could be applied to roofings ordinarily combustible, to render them fire resistive, both before placing on roof or subsequently when in position both to a new or old roof covering.

(g) To fix standards and official names for each roofing reported upon.

Insofar as tests of wooden shingles are concerned it is expected they will be of shingles untreated, and of shingles treated with chemicals intended to make them fire resistive.

The committee to be empowered to make use of all available reports and impartial tests of roof coverings now available and to report to the Executive of this Association, it being understood the report of the committee will be at once transmitted to all members and others interested."

MOTOR GAS FROM WOOD?

The much talked of gasoline fuel shortage may be offset by science. Fuel from forest trees and other vegetation may become the source of motive power for gas engines.

About fifty per cent of dry wood is composed of cellulose from which ethyl alcohol can be made. Ethyl alcohol is what is properly known as "grain" alcohol, and might be substituted as fuel for gasoline in gas engines. Certain palms of the tropics also contain an appreciable amount of fermentable sugars from which ethyl alcohol can be prepared. The theoretical and chemical aspects of the production of alcohol from wood are known to be sound, but the practical side has not been worked out. Thought on the subject is comparatively new and the practicability of the manufacturing problem requires further study.

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Harmonizing Forestry and Grazing

By T. P. McKenzie, Grazing Commissioner of British Columbia

The suggestion that a relationship exists between grazing and forestry in the sense that the welfare of the one is influenced by the other was, for a long time, accepted by most foresters with reservation nor was was it given the serious attention from grazing experts and stockmen that it deserved.

The forester was inclined to consider the presence of livestock on timbered areas, and particularly areas suitable for the production of merchantable timber, a decided menace and the grazing man was reluctant to admit that all the restrictions required for the conservation of the forests and water-sheds were altogether necessary where a full grazing use of the forests was apparently needed.

In the former case the forester was confronted with facts relating to the serious effects of grazing on the forested areas of the older countries and felt that he was justified in placing heavy restrictions on the grazing of livestock on all timbered areas to insure proper protection to existing and future timber growth. The latter, on the other hand, had foremost in mind the protection of the livestock industry largely dependent for its existence on the grazing use of the summer ranges which, in the west, are generally the forested areas of the foot-hills and higher ranges.

When the Governments of the West assumed active administrative control of the forests they found those portions of the country were being used by stockmen operating ranches in the valleys and who were contending with each other for the possession of choice grazing ranges. Several things stood out which clearly showed the forester that unless harmony and regulation prevailed on the range the forests as well as his administration would suffer and it became his business to inquire into, particularly, the effect of unregulated grazing on areas of reproduction and on watersheds. He necessarily had to study and solve this problem with its various ramifications for he found that the livestock could not be excluded from the forests owing to the fact that the ranches, which are essentially livestock ranches, were dependent for their existence and development on the use during the open season of the succulent grasses and weeds growing under the timber and also the fact that it was impossible to separate areas suitable for grazing from the timber producing areas for beneath the timber cover is found the forage.

Effect of Unregulated Grazing

This impossibility of divorcing the two interests naturally led to the study of methods whereby one should be regulated for the benefit of the other. In this dual management regulation developed upon grazing naturally; first because it was entirely unregulated and promiscuous, and unregulated grazing was destructive from the viewpoint of damage to reproduction and that of carelessness with fire on the part of those in attendance on the livestock using the range, secondly, because it soon developed that regulation of grazing was more needed for the protection of the range and the livestock industry than for the protection of the forests. General regulations for the protection of the timber, which are essentially lumber and trespass regulations, were provide for grazing damage separate grazing regulations wree necessary on all areas in grazing use. Primary regulations were need, therefore, for the protection of the forest and range and secondary regulation for the protection of the stockman in his use of the range.

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It has developed that the early restriction for the protection of forested areas and watersheds were really restrictions in the interests of grazing so that now-a-days when a forester knows that livestock on a forested range are being handled in accordance with a good grazing plan he knows that his forest is reasonably safe and that protection rather than damage will follow the use of the area by livestock. Overgrazing will damage the forage growth of a range long before it will do any appreciable injury to timber growth and a correct grazing plan will provide against fire on the range since experience so far has disclosed the fact that it is geenrally injurious to the forage growth on forest range to allow fires to run over it.

Restrictions for the protection of reproduction, camping grounds, etc., which closed definite areas to grazing have generally been opposed by the grazing interests, the main reasons given being that grazing did no damage, that the monetary returns to the country from the livesock concerned was greater than that derived from the reservation of the areas of forest land involved. The more crowded the range and the greater the demand for grazing privileges the stronger was the opposition.

Have Common Interests.

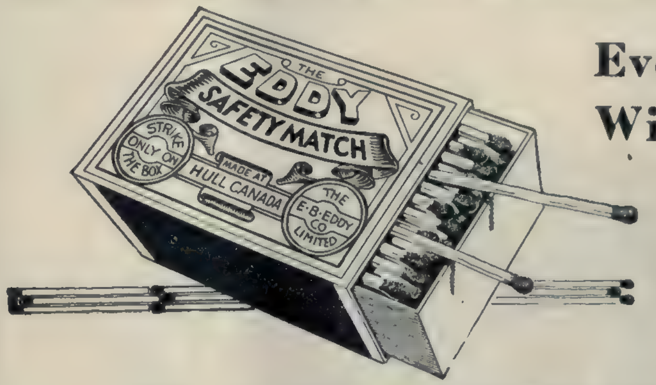
It is very seldom, however crowded a range is, that the stock cannot be handled in accordance with an amendment to an existing range plan, and more particularly is this the case where no plan is in effect and unregulated grazing prevails. Experience has shown that sheep can be easily handled on a range in a way that will prevent wastage of forage that equals fifty per cent of the forage crop and which would be lost under the methods of grazing in use before control measures were exercised. Cattle ranges, supposedly fully used and rapidly deteriorating under regulated grazing, have easily increased in capacity three hundred per cent where range management plans were put into practice.

This shows that grazing can be regulated to protect reproduction, watersheds, to reserve areas for public recreation and for other purposes without the slightest detriment to the grazing interests and that what is beneficial for the forest results in benefit to the stock industry in that it promotes wise range management and control of the stock in its use of the range.

It is now conceded that regulated grazing is a protection to forests in that it disposes of the annual growth of grasses, weeds, etc., which, if left untouched, in the course of a year or two constitutes a serious menace in the spread of fire. It is also conceded that the regular and correct use of a forested area by livestock promotes the growth of reproduction by breaking up debris and harrowing the seeds into the mineral soil. Many stockmen insist, however, that this growth of reproduction is a menace to the livestock industry in that it decreases the area of grazing range which they contend is a serious thing in crowded communities where ranches are dependent on the summer range. A serious restriction of the grazing interests in this respect demands the attention of the forester being turned to the question:

"Which is the most vital consideration in the matter: The conservation of the timber or the prepetuation of the grazing industry."

Any investigation into a question of this kind entails an immense amount of serious study. The forester realizes that only on the areas of timber and potential timber land under his jurisdiction can timber be grown for the present and for the uncertain needs of the future; and on the other hand the stockman is reluctant to admit that his property can possibly, in a case of dire necessity, be put to an-



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other use than that of raising range cattle.

A Test Case

The intricacies of a question of this sort is really a subject for a separate paper but the mention of the two instances where grazing was apparently opposed to timber production will show the need for careful attention and study of all suggestion that forested lands be denuded of their cover by fire, or otherwise, to promote the growth of forage for livestock.

The plateau of the Cariboo and Lillooet grazing ranges of this Province are producing largely Jack-pine and lodge-pole pine of a general open character. Sixty or seventy years ago these ranges evidently produced the type of Douglas fir peculiar to the interior but numerous fires have resulted in a general Jack-pine and Lodge-pole stand with scattering areas and individual trees of Douglas fir. If proper protection were given it is possible the present stand may again be replaced by the Douglas fir.

When the control of grazing was first assured over this area there was in evidence a general feeling that the existing timber was useless and should be cleared off. Two principal reasons were given; one, that the character of forage growing under the timber was inferior and unpalatable and that the removal of the timber was necessary to promote a better growth; and two, that in many instances the growth was so heavy that grazing was restricted. A third reason given, which is somewhat apart from the actual grazing use of the range, was the desire in some cases to destroy the timber to promote a rapid run-off into reservoirs and catch-basins.

The willingness on the part of the Government to consider the question of the highest use of the land led to an investigation which disclosed hte fact that during the years 1919 and 1920 over $300,000 worth of ties and bridge-timber alone were cut from an area extending about 100 miles along the line of the Pacific Great Eastern Railway. Apart from other matters, such as the fact that there is an abundance of unused range, making it necessary to burn to create range, and the fact that the forage growth in the timber is very palatable, the present and future value of timber, which in the past on like remote areas has been considered negligible will always be matters of most serious import in spite of the fact that existing graing conditions and grazing needs may indicate that timber protection on such areas is a question of secondary importance.

Another event of tremendous importance to forestry and grazing interests of the west is the stand taken by the Prairie City Stock Association of Oregon, in the United States, in the matter of fire protection on the range. The attention of this Association is turned to the protection of the Malheur and Whitman National Forests, areas of forested range supporting during the summer approximately 20,000 cattle and horses and 130,000 head of sheep, and more particularly to the ranges occupied by members of the Association.

An Oregon Conclusion.

For years before the United States Forest Service assumed control of the forest range the general practice prevailed of burning out heavily timbered and brushy areas to provide new and better grazing grounds. In some instances tem-

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porary results were obtained but years of this sort of thing had not been well for the range. Fallen dead timber has prevented the grazing use of some areas. Further burns on such range destroyed the fertility of the soil. In other cases unpalatable browse and weeds has followed and in others heavy reproduction has made conditions worse for grazing than the original conditions. There has, therefore, grown up a steady and firm sentiment in favour of forest protection, from the stockman's viewpoint, primarily to protect the range. This sentiment has resulted in the passage of the following resolution.

Prairie City, Oregon,
March 27, 1920

Resolution adopted by the Prairie City Stock Association.

RESOLVED:—We the Prairie City Stock Association, hereby pledge our hearty cooperation with the Forest Service, in protecting from fire the timber and forage crop on the Malheur and Whitman National Forests.

1st. All members of this Association are hereby instructed to report to some member of the Forest Service, all smokes or other signs of fire discovered by them within the bounds of the Malheur and Whitman forests or on lands adjacent thereto, at the earliest possible time after discovery, no matter what inconvenience it may cause the individual member, so long as there is no danger of bodily harm to the member in the performance of this duty.

2nd. The Ranger in charge of the Crane Prairie Ranger District is hereby authorized to use the employees of any member or members of this Association, or hire such additional help as he deems necessary to suppress any fire that may occur on either the Crane Prairie, Flag Prairie or the Logan Valley cattle and horse ranges during a given period, if it is possible to do so without the aid of our members at a busy time.

4th. Any expense incurred under the second and third clauses of this resolution shall be reported by the Ranger in charge to the Supervisor and he in turn shall report the bill to the Secretary of this Association. All bills thus reported shall be paid by the users of the range on which the expense was incurred.

5th. Any member of this association or any person holding a grazing permit on either the Crane Prairie, Flag Prairie or the Logan Valley cattle and horse ranges violating any section of the above resolution shall be deemed a trespasser and the Forest Supervisor is hereby asked to proceed accordingly.

The Secretary is hereby instruced to send a copy of this resolution to the Forest Supervisor of the Malheur Forest, and a copy to the ranger in charge of the grazing districts herein specified.

THE PRAIRIE CITY STOCK
ASSOCIATION.
/s/ F. B. French, President.
Attest /s/ Walker Deardorff, Secretary.

The above resolution is evidence that forestry protective regulations are beneficial to the stock interests in the same way that range protective regulations benefit the forest.

From the above it will be seen that the grazing use and timber protection on the same ground are so interrelated that one is dependent on the other in no small degree and that plans for both must be cooperative in effect if the best interests of the two are to be served. Since timbered areas of the west embrace the summer grazing ranges for the adjacent dependent ranches the two interests cannot be divorced and since the primary protective regulations relating to both industries are interrelatve and perpetuating regulations for both industries there should always exist in sections where this dual management prevails the best cooperative spirit between the forest and grazing interests. Each must deal broadly with all

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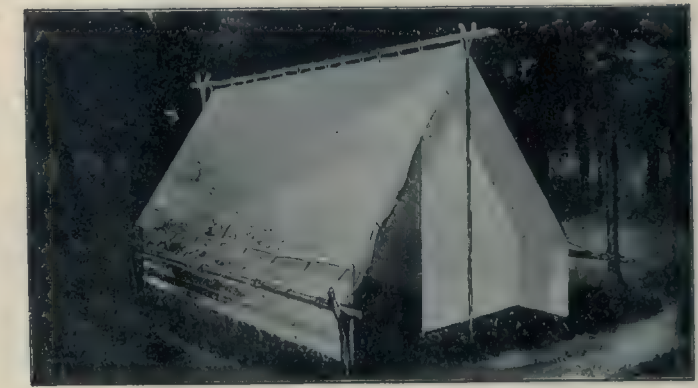

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apparently opposing matters; the forester realizing the needs of the grazing industry and the grazing men and stockmen keeping in mind the fact that it takes a lifetime to produce a mature tree and what at the present time may appear to be a curse will possibly develop in the near future to be a blessing. The very fact that it takes so long to produce timber requires that the grazing man give the interest of the forest the benefit of every doubt and in this he is aided by the fact that there is generally an abundance of summer range for all if it is properly used so, in consequence, if one area cannot be grazed for a while there is another available though perhaps more difficult to handle.

The annual growth of forage should be considered just as vital and important a product of the forest areas and potential forest lands as the timber and not only should foresters study the grazing use of such lands but grazing men should promote the protection of the timber for in doing so they protect the grazing resources. On many areas of the interior where generally inferior timber is produced and which are the main grazing lands of this Province the major activity for many years will be the range management work but, as shown in regard to the Cariboo-Lillooet plateau, there is always the possibility of important lumbering operations developing. It therefore behooves all grazing men to manage their range work to protect and to promote the growth of the timber being produced thereon.

As intimated before a true grazing plan is also a forest protection plan. It also behooves the forester to look kindly upon this grazing use of his forests for he will find that the one-time supposed menace can be and is a friendly aid to him in the protection of the timber resources of the country.

DID NOT PRACTICE FORESTRY.

Anatolia is the Turkish name for a large part of Asia Minor. Wood is so scarce in Anatolia that it is seized as rapaciously as if it were worth its weight in gold.

It is so scarce that carloads of vine-prunings, thistles, and briers are transported into the towns and villages for fuel. One who has made a fire of this nature of fuel on a country roadside is unpleasantly familiar with the endless task of feeding the flame to secure a very uncertain heat.

Firewood in Anatolia costs from $15 to $18 a ton when it can be had. The Nationalist Government has prohibited the Near-East Relief from buying wood in this district except on specially vessikas or orders. Tho one does not usually class fruit-trees, as fuel, even these have been cut down and burned, so desperate is the need for firewood.

It is this lack of wood that has hampered the Near-East Relief in a great measure in its provisions for the Armenians. There is not only the scarcity of fuel to combat, and the consequent suffering with the cold, but there has been no wood for making furniture nor, of course, for building purposes. The orphanages are built of mud, and as far as possible the gasoline can has supplanted wood in supplying household needs. It is beaten into chairs; every needed kitchen utensil once held gasoline; it becomes both a bathtub and the dipper that is used to fill it; it is the plate, the cup, and the spoon. Unfortunately, it can not be utilized as fuel.

But—there are no trees. And we of America, who can not turn to the left or to the right without the eyes resting on a beautiful tree—are spiritually exhausted after an hour's trip through Anatolia and are eager to return home.—Francis L. Garside.

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THE FOREST AS A PERPETUAL WOOD FACTORY.

(Concluded from p. 474).

vegetable matter in the soil is dark colored and so readily absorbs heat; it is mostly carbon, and carbon when once warmed is one of the best conservators of heat. Therefore, soils containing large quantities of humus are warmer than otherwise.

An Improver of the Soil.

You see, the forest community reacts upon the soil by making it constantly richer in food materials, richer in moisture, richer in heat, at least more uniform in heat relations. You see what this means: A progressive change in the adaptability of the soil for various trees. This is one of the chief factors at the basis of the succession which we have already noted. You must have this conception before you can wisely direct and regulate wood production.

The forest community reacts upon the light conditions, so that they are different from those in any other community. And here also we find progressive changes, varying with the age of the community and usually improving as the community grows older. At each age class, if we put them 20 years or so apart, there are different light values beneath the forest. This gives the opportunity for the various species requiring different degrees of light-exposure to come in. This is another chief factor in succession leading to gradual changes in the forest complex.

At the Timagami (Ontario) camp we found a stand controlled by red pine with about 200 trees of that species per acre. There were also 67 white pine trees on the same area. These made a nearly complete crown cover. We could find no small trees of red pine or white pine, but there were 140 balsam, 120 cedar, 45 spruce, and 5 paper birch from 1 inch to 6 inches in diameter on the average acre. The red pine was 160 years old. It had at least 100 years in which to scatter its seed on the ground, but has not yet succeeded in establishing a single young tree to take the place of the now dominant trees as they pass away. Undisturbed by man, that stand of red pine will gradually die out. Single trees, as they fall, will be replaced by a group of shade-endurers already occupying the soil. In the end, the dominance of the intolerant pine will be supplanted by the tolerant balsam, cedar and spruce.

Why Pine Dies Out.

In Timagami, also, there are pure stands of white pine nearly 300 years old. They have been scattering seed on the forest floor for over 200 years, yet they have not succeeded in establishing any young to take their places in the

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forest, but there is a great abundance of balsam and spruce regeneration beneath the old pine trees and they will eventually displace the pine and control the stand.

Pure stands of light-demanding species cannot maintain themselves in competition with shade-endurers. When by the natural processes of elimination and decay the crown cover has been broken sufficiently to give overhead light to the forest floor, a condition in which light-demanders might establish themselves, the ground is too densely shaded by an advanced growth of shade-endurers. When they in turn have reached the dominant crown class, they have the next crop of their own species already established beneath them. So the rotation may go on generation after generation. The only way a pure stand of intolerants can be re-established on the area is by some catastrophe such as windfall, insects or fire completely removing the crown cover. Then the struggle between tolerants and intolerants will begin all over again.

Thus we see, when light values change in the forest there is a disturbance of equilibrium and the nature of the gegetation changes. Here again you must understand the significance of these progressive changes in light values, if you would successfully direct and regulate the growth-energy resulting in wood production in the forest.

Nature a Poor "Business Manager."

Foresters are dealing with an individual, an organism whose development can be fashioned and guided into the lines which they desire and that desire is for the largest quantity of the best quality of wood, adapted for some particular purpose. Nature has no economic sense. The function of foresters is to improve upon nature as expressed in the forest and guide her into economic channels, just as the farmer has improved upon nature in his work and compelled her to serve his economic purposes. Where would we be today if the farmer had allowed nature to have her own way? Why, we would have no No. 1 wheat, no dent corn, no northern spy apples, no jersey cows. Having produced these things the farmer still has to control nature or otherwise his wheat fields would be full of tares, his corn covered with smut, his apples filled with worms, and the jersey cows filled with tuberculosis.

So as time goes on foresters will be more and more concerned in controlling the destructive forces in the forest, above all the fire demon and then the fungus and insect pests.

How an American State Combats Forest Fires

HARRISBURG, Pa. — Pennsylvania now has a forest protective organiation that surpasses all other State and National fire-fighting forces, according to a statement sent to Gifford Pinchot, the State's Chief Forester, by the U.S. Forest Service. Nowhere in the United States has so complete a plan been perfected for the prompt detection and extinction of fires, and for the inspection and elimination of hazards.

Forester Pinchot has devised a better method of fixing the legal and financial responsibility for all forest fires, and in his new organiation men who combat fires will receive pay commensurate with services performed.

An appropriation of $1,000,000 by the Legislature for forest protection has made it possible for the Department of Forestry to purchase and erect 50 steel forest fire observation towers. Most of these towers are sixty feet high, and they have been put up on the highest mountain tops in the State.

Eighteen other steel towers were previously erected, giving the Department of Forestry sixty-eight stations from which observers may detect and locate forest fires. Everyone of the towers is connected by telephone with men in nearby communities whose duty it is to respond with a crew of men to attack the flames when fire is discovered.

Roads and trails have been constructed in many of the State Forests, so that the remote sections are now more accessible to Foresters and their fire-fighting crews. Each forest district has been divided into blocks of forest land, extending from 50,000 to 150,000 acres. Each area is in charge of an inspector, each tower is manned by a towerman, fire bosses have been selected from the best fire wardens located at convenient points for the suppression of fire.

Fire crews have been organized, equipped and trained so that they are ready immediately to respond when calls come to the fire bosses from towermen or inspectors. Patrolmen and wardens are other units in the fire protective organization.

This organization, heading in the office of each District Forester, has given Pennsylvania a systematic plan for the prevention of forest fires that is far better than anything of a similar nature that has been attained in the United States.

The State's forest fire fighters this summer were equipped with modern appliances. The Department of Forestry has supplied them with 1,000 compressed air tanks, which will spray water onto flames. Four gasoline water pumps have been given to Foresters in districts where they can be used advantageously. For backfiring torches were provided, as well as 3,000 collapsible pails, 1,200 hand axes, 1,000 double-bitted axes, and 5,000 canteens, and 5,000 specially constructed fire tools were distributed to the men who will protect forest lands from fires.

In the past the only equipment forest fire fighters had were the crude implements they took with them. Sometimes the men depended upon forked sticks, or branches of green pine or hemlock. Now the men are properly equipped with the best fire-fighting tools that can be provided.

In some of the State Forests, where conditions are favorable, strips of bare soil have been made through the centre of all woods, roads and trails. These strips of exposed mineral soil will permit rapid setting of back-fires, and, if a strong wind is not blowing, will also prevent surface fires from crossing trails. The strips were made with shovel plows, such as were used by the early settlers breaking new ground.

KONGO AIRPLANE SERVICE.

It is reported that the directors of the Borminiere Diamond Mines Company have suggested the inauguration of an air service by seaplane, which would operate between the mines at Djoko Punda, on the Kasai (a tributary of the Kongo) and Kinchassa, on the Kongo—from which latter point the railroad runs to Matadi-noki, a steamer port on the lower Congo. The directors offer to defray the greater part o fthe initial cost of the scheme. In the meantime a survey of the route is being undertaken. The distance from Kinchassa to the mines is approximately 500 miles, which could be covered in two days, as contrasted with over a month by the existing river transport.

A strange invitation in the wilderness. The cotton sign tacked to the tree by a fire ranger of the Dominion Forestry Branch on Clearwater Forest Reserve, Alberta, reads: Dinner: menu: Bacon and beans; more bacon and beans; coffee and a smoke; water, six pails and enough elbow grease to put out the fire.

IRRIGATION AND FORESTRY.

A Resolution passed by the Western Canada Irrigation Association.

Moved by Peter Lund, Lethbridge, seconded by Lawrence Peterson, M.L.A., Taber,

Whereas this Association is fully apprised of the interlocking of forest conservation with the maintenance and extensions of irrigation farming, both directly in conserving water in the mountain and hill streams and lakes, and indirectly in maintaining suitable summer pastures for flocks and herds that can be wintered on the produce of irrigated lands, and

Whereas this association realizes the general economic and social benefits accruing from the extension of tree planting on the prairies,

Resolved,—That this Association records its appreciation of the continuous efforts for conservation of our National Forests and extension of tree-planting, both by the officers of the Forestry Service and Department of Agriculture, and by the direction of public interest to those important matters by the Canadian Forestry Association."

Don't be a "Typhoid Mary" of Pessimism

(The American Magazine)

A FEW years ago there was a mysterious outbreak of typhoid fever cases in New York City. For some time the health authorities were unable to trace them to the source of infection. Finally they ran them down to a woman employed as a cook, who was carrying around typhoid germs, to which she herself was immune but played havoc with other people. They named her "Typhoid Mary" and they separated her from her job as a cook, so that she could no longer infect others.

Too many of us are "Typhoid Marys" of pessimism. There is nothing really the matter with us. We are not even scared ourselves, but we go around talking as if we were, and all that we accomplish is to scatter germs of fear which infect others and do harm.

I have just had a talk with a business man who has traveled in forty-five out of forty-eight states since March 1st. He says that the condition of our country is wonderful. He says that if the people would shut their mouths talking about possible panics, and go on about their business we would "be in for" a period of prosperity the like of which we never saw.

He says that he has made a point of going into smoking cars and listening to men's conversation. And he adds that everywhere he has been he has found these carriers of pessimistic talk. Some of them are travelling men who have had trouble getting the goods with which to fill the orders they have taken—so they wander about the country saying that things are "going to the demnition bow-wows."

Stop going around like a "Typhoid Mary"—not sick yourself, yet spreading the germs of fear!

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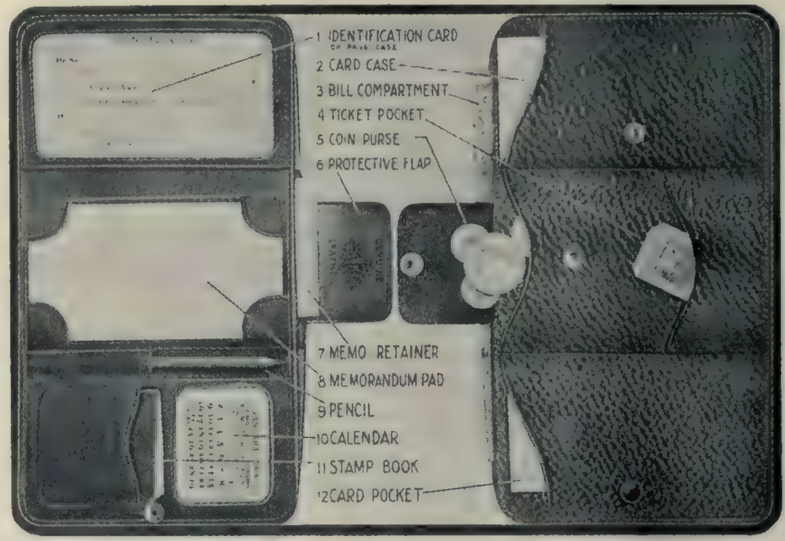

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SAYS THE GRAIN GROWER'S GUIDE.

"This year for the first time the demonstration car of the Canadian Forestry Association was attached to the Better Farming Train. This car is touring the east and the west in the interests of more trees and better trees. In charge of it is Archibald Mitchell, a man of wide experience in the planting and care of trees, who is assisted by A. G. Cooch. These two men give up all their home life for months at a time in order to spread the gospel of more trees for breaking the winds and for beautifying farm homes. Mr. Mitchell is the most enthusiastic forester I have seen anywhere, for he is not satisfied with appealing to the men who are to do the planting, but he gives interesting talks to the women and children whom he urges to remind the men of their duty in tree planting."

MY LOVE DWELT IN A NORTHERN LAND.

My love dwelt in a Northern land,
  A dim tower in a forest gren
Was his, and far away the sand
And the gray wash of the waves were seen
  The woven forest boughs between:

And thro the Northern summer night
  The sunset slowly, slowly died away,
And herds of strange deer, silver white,
  Came gleaming through the forest gray,
  And fled like ghosts before the day:

And oft that month we watch'd the moon
  Wax great and white o'er wood and lawn,
And wane, with waning of the June,
  Till like a brand for battle drawn
  She fell, and flamed in a wild dawn.

I know not if the forst green
  Still girdles round that castle gray,
I know not if the boughs between
  The white deer vanish ere the day:
The grass above my love is green,
  His heart is colder than the clay.

—By Andrew Lang.

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THE
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CANADIAN
FORESTRY
MAGAZINE

VOL. XVII. OTTAWA, CANADA, DECEMBER, 1921. 510 No. 10

Christmas Trees and Forest Conservation

The Cutting of Trees for Decoration Has Infinitesimal Effect upon the Timber Supply, and is Justified from Farmer's and Customer's Points of View.

By Clyde Leavitt, Chief Fire Inspector, Board of Railway Commissioners.

Each year, the holiday season brings its crop of suggestions from public-spirited citizens that in the interest of forest conservation the exportation of Christmas trees from Canada to the United States ought to be prohibited, or that the cutting of such trees should be altogether stopped.

This agitation, so far as it exists, is based upon the known fact that our accessible forest resources in the eastern provinces are by no means unlimited, but on the contrary are being rapidly reduced in quantity through fires and lack of adequate regulation of cutting methods, thus seriously threatening the future development of the great lumbering and pulp and paper industries, upon which so much of Canada's prosperity must continue to depend. The argument is advanced that the young growth cut for Christmas trees ought to be left standing, to grow to pulpwood or saw-timber size. There are, however, a number of points which should be taken into consideration in this connection.

Where Most Xmas Trees Come From.

In the first place, the great bulk of Christmas trees cut in Canada for export to the United States are from privately owned lands. In many cases, they are cut from pasture lands upon which the farmers desire to keep down the tree growth in order to maintain the pasture as such. In other cases, trees are cut from swamp areas or muskegs where the growth is very slow, but where growth in the open is favorable to the symmetrical development of the tree, thus rendering it particularly suitable for Christmas tree purposes. In neither of such cases would the prohibition of the exportation of Christmas trees or of their cutting for local use be likely to have any noticeable effect in the direction of increasing the supplies of material suitable for pulpwood or lumber. To not more than a practically negligible extent are such trees cut from the great areas of timber limits, generally more or less remote, which comprise the areas upon which the lumbering and pulp and paper concerns depend very largely for their supplies of raw material.

It has not been very seriously suggested that residents of Canada should be prohibited the use of Christmas trees. These trees are usually available locally. If, however, exportation to the United States were to be prohibited, there would be many farmers or other owners of private lands, along the International boundary in Quebec, New Brunswick and Ontario, whose market for Christmas trees would be cut off entirely or greatly reduced. It is reasonable to suppose that in such cases serious objection would be raised by them to the action suggested. The selling of Christmas trees affords farmers and others an opportunity for winter work and enables them to realize a certain amount of revenue from the value of the trees, in addition. The systematic growing of trees for pulpwood or lumber involves a long-time element, which makes this usually a matter for Governments or long-lived corporations. In either case, it is a business proposition. There is no reasonable doubt that the farmer can secure a larger net annual revenue from the sale of Christmas trees than would be the case were he required to let the trees grow to sizes suitable for either pulpwood or lumber, quite aside from the fact that he may have good reasons for wanting to get rid of the trees, as well as to realize upon them within his own lifetime. Only in the event of its being obviously necessary in the public interest would such governmental interference with private property be justified as would prevent the farmer from realizing upon his own property in the way which, in his own judgment, offers the best financial return for himself. There does not appear to be any such public necessity involved in this case.

This is the Real Waste.

As a matter of fact, the waste in connection with pulpwood and saw timber operations in all our forests outweighs many thousand times over, any possible loss which can be figured in connection with the Christmas tree trade. The annual loss from preventable forest fires is in the same category. Before any government can take the matter of the Christmas tree trade so seriously as to contemplate prohibiting exports, it should first cast out the beam in its own eye, by providing really effective forest fire protection and by taking steps to eliminate unnecessary waste of merchantable material in connection with logging operations on Crown timber lands. This applies to Crown timber areas under the jurisdiction of the Dominion Government, and also each of the provincial governments, without any exception.

The greatest pity in connection with the Christmas tree trade is that the farmers or other private land owners often secure so small a percentage of the retail selling price in payment for the trees so cut. There is an excellent opportunity here for a regularly established business, paying good returns for the labor and capital involved. As a matter of fact, in various parts of Canada and the United States, the systematic growing of Christmas trees is a regularly established business. In some cases the cost of establishing forest plantations for the growing of pulpwood or lumber is largely paid for by the thinnings taken out from time to time in the form of Christmas trees. In other cases, plantations are established for the sole purpose of sale in the form of Christmas trees. These are paying businesses, and there is no more apparent reason why obstacles should be placed in their way, than would apply in the case of any other industry manufacturing goods for export or for local use.

A Paying Plantation.

On page 391 of the Canadian Forestry Magazine for September, 1921, is a report of intensive management of a forest plantation for Christmas tree production. This plantation is situated in Monroe County, Pennsylvania, and consists of spruce and balsam,—species which are very plentiful in eastern Canada, and the ones generally cut for Christmas tree purposes. In this case, the method of operation is to cut off the tree above the lowest whorl of branches, removing also all of the lowest whorl except one branch, which is left on the stump. This branch continues to grow, and finally assumes an upright position, taking the place of the original stem, and developing branches of its own, so that in time it can itself be cut for another Christmas tree. In this way the plantation has been managed for continuous production during the past 20 years.

It is probable that all the Christmas trees cut in Canada each year would not be more than could be grown on a very few square miles of fully stocked plantations, either under the above system or by replanting each year to replace the trees removed. The area involved in this business is so small in proportion to our enormous areas of forest lands as to be practically negligible.

We Sell to U.S. 320,000 of Them.

So far as trees cut for export are concerned, it is estimated from Customs Department returns that around 320,000 Christmas trees, valued at $50,982, were exported from Canada to the United States during November and December, 1920. At 1,000 trees per acre, this would represent the annual product of 320 acres or one-half of one square mile of plantations. Assuming a growth period of 10 years after planting, the area required to produce this number in perpetuity would be 3,200 acres or 5 square miles, assuming that the crop would be worked on rotation, the area cut over each year being at once planted up. For natural growth, the area would of course be larger, but in any event not of any substantial consequence in proportion to the considerations above discussed. Hundreds of square miles of forest lands, containing more or less of valuable young forest growth, are burned over each year, by preventable fires, due to the lack of adequate provision for prevention and control.

The Christmas tree trade is a legitimate business. It furnishes winter employment and brings in a substantial revenue. Those who purchase its product presumably get value received, in the form of pleasure for themselves and their families, else they would not spend their money in that way. The cutting of Christmas trees is not prohibited in any of the States of the American Union, a popular misconception to the contrary notwithstanding.

The very commendable anxiety for the future of our forests might much better be directed toward securing really adequate protection from fire over the hundreds of thousands of square miles of forest lands where the provision for this is still inadequate.

The well of Evangeline, at Grand Pre, Nova Scotia. (See accompanying note.)

The Willows at Evangeline's Well

"At Grand Pré, too, are the Acadian willows, not only picturesque, in themselves, but wearing an air of romance and poetry that enriches the whole scene. It is hard to believe we live in the things of to-day in the presence of the willows of Grand Pré. There are a few very old and very decrepit ones on the road leading from the railway station toward the town. They can be regarded with unstinted emotion and unbridled imagination, for there can be do doubt that they were really put there by French hands as much as a hundred and fifty years ago, and have witnessed the tragic scenes that make the history of this part of the country so memorable.

But it is in a meadow upon which the railway station faces that the interest of to-day chiefly centres. Across a wide field is to be seen a row of willows, and near them is an old French well, of course called Evangeline's well. There is no question about the antiquity of the well. It is as genuine as the willows, and if the pilgrim wishes to touch its sacred water with his finger-tips one does not see how harm could follow."—From Margaret Warner Morley, "Down North and Up Along."

A Practical Plan for a Prairie Town Park

By Archibald Mitchell, Western Lecturer of the Canadian Forestry Association

Editor's Note:—The following article represents a working plan for a prairie town park. It was prepared for the local authorities at Kindersley, Saskatchewan, but with modifications can be adapted to hundreds of Western communities:—

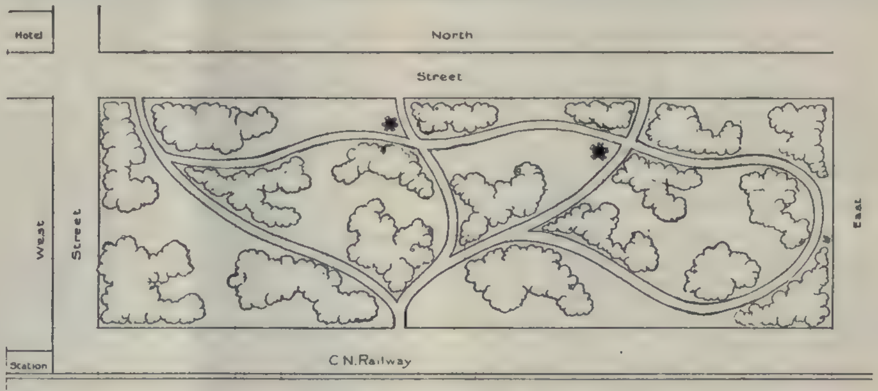
Situated so close to the station, this Park should become a beauty spot and a very great asset to the town. At present it is not. Indeed! with its rows of neglected trees standing among grass, mostly fox-tail, it is an eyesore. A good beginning to grow trees has been made at one time but, as is usual among the smaller towns, the constant cost of upkeep was too great and it fell into neglect. A move in the right direction but not very happy in its execution.

As everyone knows, the outstanding feature of our prairies is the shortage of rainfall. This is recognized in our farm operations and has to be allowed for in all plant growth, be it grain or trees. Moisture must be conserved in the soil for the use of the growing plants by a summerfallow or some other means, otherwise it escapes to the atmosphere and plants don't grow. In the case of trees, this moisture escape is very much accentuated when grass is allowed to grow among them and exhaust the moisture from the soil. Periodic summerfallow permits the growth of grain crops, and constant cultivation, the growing of trees. But constant cultivation is expensive and very few small towns, or indeed individuals can afford it, and some other means must be found to enable us to conserve sufficient moisture for tree growth. We find this in planting the trees in dense enough masses, close together, and in using such varieties that the branches quickly shade the ground and so preserve the moisture in the soil for the use of the trees and for them alone. This is applying to prairie conditions the principles we find obtaining in the natural forest and this is the principle I am suggesting should be adopted in planting your park.

Solid groups, or islands of trees, dense enough and of size enough, and presenting mass enough to keep the sun and winds from drying out the ground underneath. The trees in the groups must be planted not more than four feet apart each way, as the closer they are the sooner the branches meet and the need for cultivation with its attendant expense will cease. In three years, if good cultivation is carried on, the groups should be beyond all need for further work and the Park of expense, unless for trimming off the edges of the roads and tree islands once a year or so,

BEAUTIFUL PLAYGROUNDS FOR THE CHILDREN AT COALDALE, ALBERTA.

The school on the bare prairies deserves tree-bordered grounds as quickly as man and nature can supply them. At present, too many school boards are content with erecting fine buildings. The prairie province schoolchild is entitled to the same natural beauties that the Ontario or Quebec child enjoys. Nowhere in Canada do trees grow more readily than on prairie soil.



Plan of Park at Kindersley Sask ·
· 1920 ·

Highly attractive arrangement of tree groups and curved roadways at Dominion Tree Nursery, Indian Head, Sask.

Not Surrey but—Saskatchewan. A prosperous example of mixed farm ing in which the owner's shelter, built of trees, play an important part. Under prairie conditions trees are a great physical asset in breaking the force of winds.

and the mowing of the grass with an ordinary hay mower.

There will be no need for watering, either when the trees are planted or afterwards. The preparatory summerfallow, cultivation three or four times the first three years, and the density of the soil shade afforded by the trees themselves will be quite sufficient to provide all the moisture necessary.

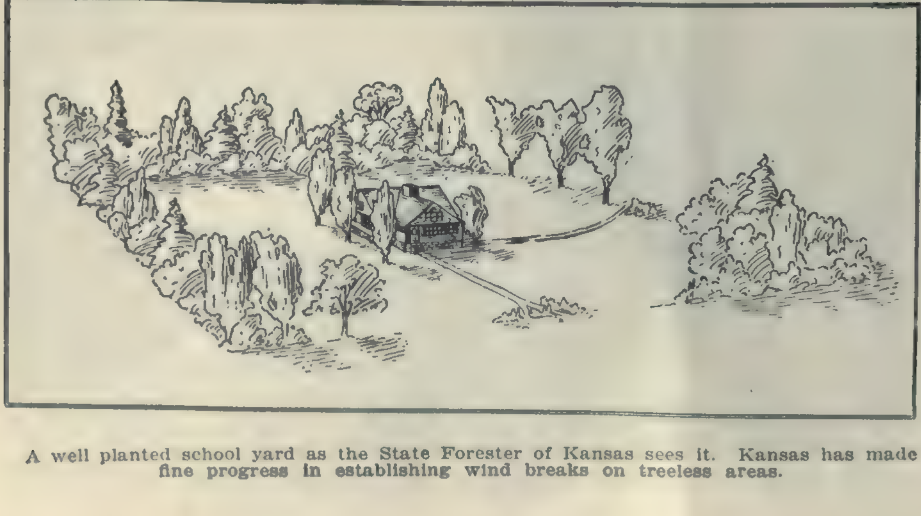
In this way the cost of establishing the Park will be cut down to the very lowest, and its maintainance, its upkeep afterwards should be very little.

The Arrangement of the Park.

In the arrangement of the walks and groups of trees, some explanation has to be made.

A Park is a place for recreation, some place where a man can go and forget his usual surroundings. As somebody has said, it is a place for "mental sanitation." The usual landscape of the prairie is in straight lines. The roads are straight, east and west, north and south and so are the houses, the streets and sidewalks, even the horizon is usually straight, and when a man goes into a Park he has a right to have a chance to forget all these things. And so, in this plan, the walks and groups of trees are in curves.

In all Parks, certain natural objects and conveniences have to be observed, and in this case these are the gate openings already provided on the north and the opening in the middle on the south leading to the round house. There are already two foot paths converging on that southern gate, indicating that it is a convenient place through which the railroad men may reach their work. This is a convenience that must be provided for and is in the plan. Bearing in mind the prime reqiusite of a Park, the change from straight lines, the walks so provided are no longer straight, they are in easy curves and to give them a natural appearing reason for their being so, certain tree groups are arranged so that the walks must swing around them. The pleasure of the walk through the park is much enhanced by these natural obstructions, by the added pleasure of anticipating what is to be seen as we advance around the curve. In the other paths, the same idea is carried out, adding very much to the attractiveness of the whole arrangement. The islands or groups of trees are arranged with the same object in view, to add to the attractiveness of the park by presenting irregular outlines on every side so that a stranger



A well planted school yard as the State Forester of Kansas sees it. Kansas has made fine progress in establishing wind breaks on treeless areas.

coming into the centre would be so struck with the suggestive attractiveness of the grass lawns disappearing round the islands and into the bays of them, that he would be at a loss which to explore first. With such an arrangement the scenic value of the park is multiplied manyfold, because, no matter in what direction one may take a dozen steps there is an entire change of outline and attraction in the grouping of the trees and grass. As time goes on and the town can afford it this attractiveness could be very greatly added to by planting clumps of flowering shrubs and perennial flowers on the borders of the tree islands. These, obtained small are not costly and $20 or $30 worth planted each year would in time add immensely to the value and attractiveness of the park.

Planting Material.

The trees at present in the park are arranged in rows, which is not in accordance with the plan.

The groups as indicated should be adhered to as far as possible and where good trees occur in a group location, they should be left standing, unless they are going to unduly interfere with the working of the ground in preparing for planting.

There are some 250 trees in the park and as the whole planting will require some 2,000 this will leave 1,700 to provide for. Bearing economy and also efficiency in mind, seedlings and cuttings should be used. These small plants will not make much of a showing the first year but will in the second, and in the third will average six to eight feet high.

The outlines of the groups may be well indicated by planting the large trees here and there in them. There should be some twelve to fourteen of these for each group and they should be planted not wider than eight feet apart, thus leaving room for one tree between to thicken up the group.

These thickening-up trees should be planted, notwithstanding what anyone may say to the contrary. Remember we are not growing trees so much as masses of bush which are to be dense enough in three or four years to take care of themselves and require no further expense. The trees may be in rows to facilitate cultivation.

A beautiful garden effect at Cupar, Saskatchewan, on the C.P.R. station property. Note the excellent growth of the trees.

Thousands of prairie farmers with successful shelter belts of trees regard tree planting as their most profitable investment. Trees have made "Home, Sweet Home."

What Trees to Choose.

The new material required will be some 600 maples (rooted plants), 600 Russian Poplar (cuttings), 200 Elm (rooted plants), 200 Ash (rooted plants), and 150 Jack Pine.

They should be arranged as nearly as possible, as per the planting plan attached.

No provision is made in the planting plan for pines but these should be arranged here and there in the groups near the borders for the sake of effect as good taste may direct.

A few Spruce may be added but as they are subject to an insect attack on the prairie, they should be used sparingly.

It may be possible to get as many Russian Poplar cuttings from your own trees as will do. They can be planted in the piece of garden at the east end of the park next spring, and the trees resulting planted in the groups next year.

The Maple, Ash, Elm and Pines should be 12 to 18 inches high or perhaps 2 feet.

Laying Out the Grounds.

Arranging the walks and groups on the ground according to the plan should not be difficult.

I should suggest the purchase of 1,000 twelve-inch pot labels. They are quite inexpensive and easily seen. With them and a line of binder twine to get the curves smooth, the walks should be laid out first and they should be 6 ft. wide. Each square of the plan represents one yard, so this should not be difficult to carry out. The walks, as far as possible, should conform to the plan though, if this means the removal of a good big tree it need not be slavishly adhered to. They should, however, be in easy curves with no short turns or crooks.

After being pegged out with the labels and the twine, on both sides, a number of good stout 2-inch x 2-inch pegs should be driven in to mark the location of the walk, and the labels used elsewhere. The actual making of the walks should be left till the tree groups are all laid out and the planting of the large trees done.

In marking off the tree groups, the trees already in them may be left, but the outlines of the groups should be made as near as possible according to the plan.

The grass should not be closer to the trees than four to six feet after everything is finished.

The transplanting of the trees may be done next spring as they will not have far to be moved and cultivation of the ground during summer will enable them to get a hold of the ground again. The ground, however, will not be fit for planting the small trees till Spring, 1922. The small trees will require moisture stored to give them a start.

The big trees may have about half of their branches removed on being planted, as this will help them to recover better. These branches will be taken from here and there all round the tree to preserve the balance as pointed out.

A good summer fallow of the grass land all one year will provide a good seed bed for grass the following summer.

(Continued on p. 538.)

Above Cameron Lake looking East, Waterton Lakes Park, Alberta.

Dominion Forest Reserves are The People's Forests

The National Forests Protect Stream-flow and Provide Timber, Fuel, Hay, Pasturage, and Recreation for the Prairie Residents.

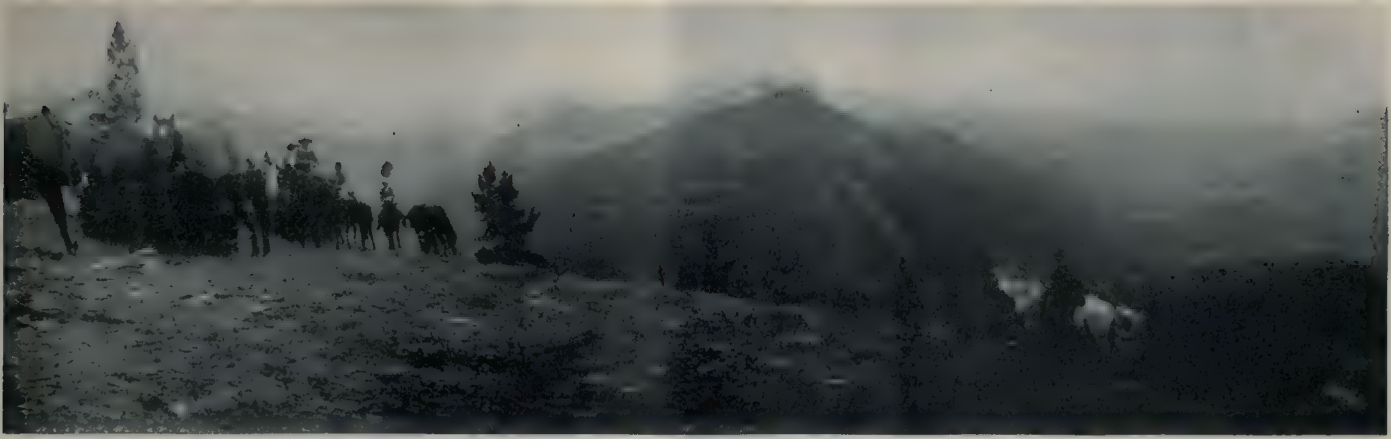
By James Lawler, Dominion Forestry Branch.

"EVERY acre of land put to its best use." This is the motto of the forest engineer in deciding what areas should be devoted to agriculture and what reserved in forest for the production of timber and other forest products. This is the basis on which the Dominion forest reserves in Western Canada have been set aside. No large area of land in any part of the world is suited throughout its length and breadth for growing one crop. If land unsuited to production of, say, barley is devoted to barley, then the returns will be less than if it were sown to wheat, corn, or some other crop. In the same way, a very large proportion of Canada is better suited to the growing of trees than to any other form of vegetation. There is so much land in Canada that there is no need to ask farmers to attempt to grow ordinary agricultural crops on what is commonly called poor soil. In the past, both in Eastern Canada and the eastern part of the United States, settlers were allowed to go into forested districts, where an experienced farmer or forester could have told them that, while the soil grew magnificent trees it would grow nothing else. The result was that in many cases, after a settler had spent twenty or thirty years in clearing his farm he found the soil so bad that he was forced to abandon his homestead and start out to begin life over again. In all parts of this continent the aim now is to direct settlers into good farming areas and to reserve for the production of timber the broken, rocky and sandy land. This is the character of the lands which in Western Canada have been set aside for timber production and called Dominion forest reserves. It is possible that it might be better to call these areas National forests, as the word "reserve" is not altogether a good one to use in this connection, unless it is remembered that these forest reserves are reserved for use and not from use. The fact is, the forest reserves are an extremely useful part of the Prairie Provinces and are increasingly being made use of by and for the settlers as indicated below. The subject is a most important one from every standpoint. There are now 39 forest reserves in the three Prairie Provinces and the Railway Belt of British Columbia, covering an area of 34,640 square miles, which is equivalent to a strip of land 41½ miles wide stretching across the 833 miles between Winnipeg and Calgary.

Storage of Flood Waters.

One of the great benefits which the forest reserves confer upon Western Canada is the storage capacity which they provide for the flood waters at the heads of the great rivers which flow through the prairies. The whole eastern slope of the Rocky mountains may be considered as one vast reservoir to hold back streams and rivulets which flow down the mountain sides in springtime, caused by the melting of the winter's snow. Eminent

A slough on a prairie province forest reserve, the resort of game. This picture shows two important purposes of a forest reserve. First it assists in water conservation at the heads of streams, and, second, it affords protection to game. Both these things are matters of consequence to dwellers on the prairie.



Pass Creek Summit, Waterton Lakes Park.

Courtesy Dominion Parks Branch.

agriculturists, looking at it from a purely agricultural standpoint, state that the maintenance of successful agriculture in the prairie depends upon this eastern slope being kept covered with a growing forest, and it is satisfactory to know that this whole slope, from the United States boundary northward to the northern part of Alberta, is now a great forest reserve. This fact of water storage is true of all other reserves in their location and degree.

Timber Production.

The timber on the forest reserves is viewed as a growing crop held in trust for the people of the West. The first duty is to protect it from fire and insects, and the second is to so regulate the cutting as to dispose of the dead and overmature timber and give the young growth a chance; thus it is purposed to keep up a perpetual supply of timber. This is the aim of the regulations, so far as concerns the reserves, and as regards the citizens, the object is to supply them in the following order: (1) to give to each settler residing within fifty miles of a reserve a certain quantity of fuel and building logs, (2) to give to settlers the right to cut for themselves, or to have cut for them by licensed portable mills, certain quantities of timber, charged for at a nominal rate of dues, which timber must not be sold, but must be used by the settlers either on their own farms or in the construction of roads, municipal works, bridges, schools, churches, agricultural halls, etc., and (3) where there are considerable stands of fire-killed or overmature, to dispose of defined quantities of these public competition to commercial companies for sale in towns and village, or to mines, railways, and industrial establishments. This policy has been steadily pursued, and while the amounts of timber thus made available to prairie dwellers would not seem large in a lumbering country, yet, having regard to the fact that these supplies are cut near at hand, with small, or no, charges, for transportation, and remembering also the scarcity of wood on the prairies, it will be seen that the reserves are an important factor in the agricultural and industrial development of the prairies. In France and other European countries, well managed forests have yielded an annual supply of timber for a century, and, to-day, contain more standing timber than when forest management was first applied. This is the ideal aimed at in the management of Dominion forest reserves, the attainment of which is sought by means of regulated cutting, by promoting natural regeneration, and by seeding and planting, when these are necessary.

Portable saw-mill on a Dominion forest reserve (prairie provinces) cutting lumber for settlers. As these mills saw only logs cut under settlers' permits this shows how the timber on the reserves is being used to supply the needs of settlers in the neighbourhood.

Grazing 100,000 Head of Stock.

On some of the reserves there are areas, which, because of old fires, are not now under forest, but where the forest is encroaching on them. They are now bearing crops of native grass. There are, also, grass land areas which will probably never bear trees but which, by reason of the fact that they are surrounded by forest, must be administered by the Forestry Branch. On these areas there are now pastured about 100,000 head of stock annually, composed of cattle, horses, and sheep. The grazing is regulated, so as to permit each area to be grazed up to its full capacity without endangering the pasture. That this is meeting with the approval of the settlers is shown by the steady increase in this feature of forest reserve utilization. By this means settlers and ranchers are enabled to carry much larger herds than if they were restricted to their own property throughout the year.

Game and Recreation.

Another important feature of the forest reserves is the use which they serve as fish and game preserves and as places for healthful recreation. The game is under the supervision of the different provinces

A herd of cattle grazing on a prairie forest reserve. In round numbers one hundred thousand head of stock—cattle, horses, and sheep—graze annually on the reserves. This use means much to the settlers and it is steadily increasing.

and the fish under that of the Dominion fishery authorities but the Forestry Branch co-operates with these, in this work. This means, of course, that hunters and fishermen in large numbers make use of the reserves every year. This use is not contrary to good forest management and the Forestry Branch welcomes the coming of sportsmen, so long as they respect the regulations and are careful to do no damage to the forests by fires or otherwise. The more that citizens know of the value and use of the forests, the greater care will all classes exercise in protecting them. This view is further carried out by the plan which allows citizens living near reserves to picnic, camp, or build summer cottages in locations along the shores of lakes designated for this purpose. Literally thousands of people every year enter the forest reserves for a few days, or a few hours recreation, and the number of cottages is increasing from year to year.

The People's Forests.

The purpose which the forests serve as a refuge for insectivorous birds that make war upon the insects which destroy such a large part of the farmers' crops is another way in which the reserves serve the public. In a word, the forest reserves are the people forests, and they are managed so as to get the most out of them for the public not only for the present but also for the future, when the demands for all forest products will be even greater than at the present time.

Is the Time Ripe for a Canadian Sportsman's Association?

A Letter to the Members of the Canadian Forestry Association.

Having just returned from a successful deer hunt over one of Ontario's wild game covers convenient to the Capital, I am more than ever impressed with the absolute necessity of organizing in a National way the sportsmen of Canada, in order that the assistance and co-operation of every true sportsman from coast to coast may be secured for the protection and propagation of our Wild Game Animals, Birds and Fishes in Canada.

The actual value of Canada's wild game is surely sufficient to warrant the expenditure of a reasonable outlay for their protection at the present time. Figured in dollars and cents, the net food value reaches proportions almost unbelievable. Just focus your imagination on this, legally taken by gunners who applied for 1919 licenses, which they estimate represents an actual cash value of $3,239,277. Now just figure for yourself what Canada's wild game resources would amount to. The total value is stupendous, but without the co-ordinated efforts of our sportsmen there is bound to be a marked depletion according as the country opens up and wild hunters of wild game are allowed to pursue their in-season and out-of-season depredations. Hunters also require education in wild game shooting, so that the minimum number of animals and birds may die of wounds, usually the result of wild shooting. One has only to go to the woods in deer season and listen to the roar of from four to ten shots from a rapid fire rifle, at some poor buck who really thought the war was all over long ago. This wild shooting usually means nothing except possibly a wounded deer that very frequently gets away. Cool, deliberate shooting invariably brings down your game with from one to two shots.

Canada has many valuable wild game preserves, but why not make all our present large areas of wild lands game sanctuaries, with the good citizens of this country as their keepers. No game wardens could possibly provide our Government with such accurate first-hand information from year to year as a series of Sportsmen's organizations in every centre from the Atlantic to the Pacific. Bring in the Trapshooters, the fishing clubs and all the wild game hunting clubs and group them all into one Dominion organization, to be known as "THE CANADIAN SPORTSMAN'S ASSOCIATION."

The logical plan of procedure, it would seem to me, would be to turn the whole undertaking over to the jurisdiction of The Canadian Forestry Association, who are already well organized for the protection of our valuable forests, which is the home of the wild game. Why not simply extend that protection to cover the wild game also. With their well-established Monthly Magazine, reaching scores of thousands of Canadians, what better means could be adopted of arousing public interest in the conservation of Canada's wild animals, birds and fishes..

J. MOFFATT ROSS, Ottawa.

Editor's Note:—We will be very glad to receive letters commenting on Mr. Ross's suggestions.

FROM NORWOOD, MANITOBA.

"Your magazine has made wonderful progress during the past year and is now a magazine not only of use but of interest to the ordinary layman."—THOS. H. WILSON.

DRYING WINDS AND PRAIRIE PROSPERITY.

Mr. Archibald Mitchell, of the Canadian Forestry Association's Western Canada branch, has constructed a chart which will appear in the next issue of this magazine, giving striking evidence, gathered from the official records of the Meteorological Service, as to the windiest sections of the Canadian prairies and the arguments for tree planting presented thereby.

Denizens of the Heights: Rocky Mountain Goats in Jasper Park, Alberta.

Some 1921 Forest Fires—and Canada Pays the Piper

At the time of going to press the record of Ontario's forest fire losses this year is not complete enough for publication. A few rough figures only can be given:

There were 1269 forest fires on the timbered area administered by the Provincial Government (constituting the great bulk of commercial timber lands).

The area burned over was roughly, 750,000 acres.

The approximate cost of fire fighting was $78,000.

It is hoped in the next issue to indicate more accurately the actual loss to the Province of Ontario in timber destroyed.

The Western division of the Southern St. Lawrence Forest Protective Association (patrolling over two million acres) in Quebec, reports as follows:

"We had 128 fires as against 89 last year and the total area burnt over was 22,189 acres against 34,364 last year." The fire fighting cost was $10,025 and the value of 'materials and buildings destroyed' $15,395.

The Eastern Division of the above Association patrolling over five million acres of Quebec forest reports as follows:

The fire-season has been extremely hazardous in our section. The excessive dry weather, and heavy winds which prevailed from the very beginning of the spring until late in the month of September made the situation the most terrible to any one's recollection in this part of the Province.

"Number of Fires—Damages."

Although the number of fires has not been as large as last year, each one proved much more stubborn and expensive to extinguish. According to our ranger's reports 188 forest fires arising from the following sources have been extinguished by our Association forces.

Sources—	Number of Fires.
Settlers	76
Locomotives	55
Unknown	38
Berry-Pickers	8
Lightning	4
Fishermen	3
Smokers	2
Hunters	2
	188

A total area of 50,597 acres of forest land owned by settlers and limit-holders have been devastated by fire during 1921. This means that nearly 1 per cent of the total forested area of our section was visited by fire during past fire season. The types of forest lands destroyed are as follows:

	Acres.
Merchantable Timber	12,468
Young Growth	13
Old Burn	1,959
Recent Burn	825
Cut Over Land	32,711
Miscellaneous	621
	50,598

Over $48,000 have been expended to extinguish the above 188 forest fires, being an average of $255.32 for each fire. A total sum of $38,000 was paid to extinguish only one fire.

Although no fire permit was issued to settlers from May 15th to June 15th, our rangers have given out over 5,000 permits. An area of over 10,000 acres of land were actually cleared for agricultural purposes in our division according to above permits without injuring forest areas to any extent.

We had to prosecute 55 transgressors to fire laws and secured conviction in most of the cases.

The Value of Education.

Considering the character of the season we feel that the results obtained are satisfactory and encouraging for the future. We believe that our Association has done a great deal in forest protection work and the educational campaign carried on since its formation did a great amount of good in every part of the territory placed under our jurisdiction. This campaign ought to be continued and intensified if we wish to get rid of the fire plague within the shortest time.

FISHERMEN CAUSED HALF OF NEW BRUNSWICK'S FIRES.

Fredericton, N.B., Dec. 1, 1921—The past fire season was the most serious ever recorded. The snowfall for the winter of 1921 was below the average, while the usual heavy spring rains did not follow in March and April. During the months of May, June, July and August, the records show the rainfall was 30 per cent to 70 per cent below the average. Periods from six to twenty-five days occurred without any rainfall, not even showers. The very dry condition of the soil, the lack of water in the swamps and brooks, coupled with drying winds and continual hot weather made fire fighting much more difficult, greatly increasing the cost of extinguishing forest fires.

A summary follows:—

	Acres.
Number of fires reported to the Forest Service	450
Total area burned over	72,700

Private land burned is 40 per cent of total area burned.

Crown land burned is 60 per cent of total area burned.

Of the 72,700 acres burned 80 per cent was previously burned over land.

Area of Crown Land protected	7,500,000
Area of private forest land	4,500,000

Area burned is therefore only 6/10 of one per cent of forest area.

In comparing the past fire season with that of 1920 the 1921 fire season extended over a period about three times as long. Over 100 more fires occurred, but the acreage burned over is only about seventy per cent of the acreage burned in 1920. The loss to standing timber is considerably less than in 1920, while the loss of property caused mainly by the Westfield Fire was about the same as the loss of property and wood products at St. Quentin in 1920.

Large Staff on Patrol

In addition to the permanent staff of forest rangers, a temporary staff of over 1,000 men, consisting of voluntary and co-operative fire wardens, road supervisors and extra patrolmen, were organized into a fire protection staff and rendered valuable service by their prompt action in fighting fires in their respective districts. In the matter of forest fire detection, the look-outs became very efficient and the value of this means of forest fire detection cannot be too greatly emphasized in this province. As practically all districts are connected by telephone, fires were promptly reported to the local wardens.

Causes of Fires.

Owing to the length of the fire season many causes were recorded which had not caused serious fires in previous seasons.

Fishermen, campers and picnic parties caused 50 per cent of the fires.

Railways caused 18 per cent.

Settlers caused 12 per cent.

Miscellaneous caused 17 per cent.

Lightning caused 2 per cent.

The causes of fires are not in the same proportion as in previous seasons and the damage resulting is not in the same proportion as the causes. Settlers' slash fires gave little trouble, due to the fact that all slash burning was closed off on May 10th until the fire season was over. Railway fires were greatly reduced by the systematic inspection of fire protection appliances on locomotives and the maintenance of railway patrolmen through forested sections. This was possible through the hearty co-operation of the railways in all matters pertaining to fire protection.

Miscellaneous causes, such as haymakers, working on meadows within the forest, woods crews peeling pulp, cigar butts thrown from automobiles, farmers and others smoking in the woods while hunting stray cattle and poachers, all caused a few fires which did considerable damage.

Lightning caused a few bad fires for the first time on record in this province. This was no doubt due to the very dry condition of the forest and the absence of rains following the electric storms. Lookouts have proved so successful that several more are now under construction and nearing completion. Several telephone lines are also under construction.

A MONOLOGUE

I am a Timber Tree.

I grow where no other crop will grow.

I ask not one inch of farm land in order to give Canada a whopping profit.

There's about a million square miles where once I grew and where I grow no more.

Does anything else grow on the lands from which I have been banished.

The answer is, No.

I am a Big Employer.

I had pay envelopes to 73,000 men in the lumber industry and to tens of thousands of lumberjacks who make their logs in the woods.

I have on my pay sheet every week of the year 25,000 men in the pulp and paper mills and I provide wages for another 25,000 workmen getting out pulp logs.

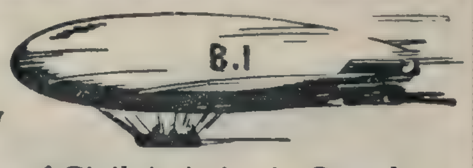
I don't know how long I can keep up this proud record. In a good many districts I have been chased out by forest fires and I can't return before the year 2,022 at the earliest. I didn't like to see the mills close in those deforested districts and the workmen turned adrift, but it couldn't be helped. If you can't make bricks without straw, you certainly can't make forest-jobs without forest.

Give me half a chance and I'll personally pay the national debt.

A CHRISTMAS TREE FARM.

The city of Stockholm, Sweden, maintains a large plantation of evergreens which are used entirely for Christmas tree purposes. The plantation is paying a profit and at the same time providing abundantly for Yuletide decoration, without the necessity of transporting trees from great distances.

AVIATION



IN FOREST CONSERVATION

A Department Devoted to the Discussion and Promotion of Civil Aviation in Canada

Edited by George A. Mackie.

Flying Services Rendered to Canada's Forests in 1921

Stations in all Parts of Dominion have Thoroughly Established the Value of Aircraft.

By J. A. Wilson, Secretary, the Air Board, Ottawa.

STATISTICAL SUMMARY OF CIVIL GOVERNMENT FLYING, APRIL 1st TO SEPT. 30th—6 MONTHS.

Station or Base.	Aeros or Seaplanes.	Flying Commenced.	Flying Discontinued.	Flying Period to Date. Total Possible Days.	Nature of Flights.									Total Flights.	Total Hours Flown.	Approx. Miles Flown.	Aver. Flight Duration. (Hrs.—Mins.)	Days on which Flying Took Place.
					Forestry Reconn., Photography and Fire Protection.	Misc. Reconn., Photography, etc.	Photographic Survey.	Exploration.	Preventative Reconnaissance.	Communication, Transportation & Demonstration.	Instructional.	Experimental Flying and Testing.	Miscellaneous or Unspecified.					
*Vancouver, B.C.	S.	--	--	183	127	34	11	--	49	35	15	11	--	282	388-42	29,153	1-23	129
High River, Alta	A.	May 6th	--	148	187	17	--	--	--	1	1	30	5	241	595-20	59,533	2-28	127
Victoria Beach, Man	S.	July 1st	--	92	56	4	1	--	--	1	5	21	1	89	163-53	12,292	1-50	59
N. Ont. Mobile Unit	S.	May 20th	--	134	105	13	--	--	--	28	--	33	3	182	321-28	24,110	1-46	100
Ottawa, Ont	A-S.	April 25th	--	159	--	40	9	--	—	34	9	20	1	113	217-35	18,480	1-55	85
Roberval, P.Q.	S.	June 2nd	--	121	57	10	3	--	--	10	--	10	1	91	161-11	12,089	1-46	63
@*Halifax, N.S.	S.	--	--	183	--	3	--	--	--	5	--	5	--	13	21-25	1,756	1-48	12
Totals All Stations				1020	532	121	24	--	49	114	30	130	11	1011	1871-24	157,413	1-51	575
Stations Average				145-7														82.1

@ Mainly Erection and Repair Base. * Open Year Round.

THE Forestry Magazine has asked for a brief description of the flying operations undertaken last summer in conjunction with the forestry officers of the Dominion and Provincial Governments throughout the country.

Particulars of all flying, civil and military, carried out by the Air Board during the six months ending September 30th, are given on the accompanying summary. We are here concerned only with civil operations; but the work of the Canadian Air Force must not be overlooked. The Civil Operations Branch and the C.A.F. are complementary services: their officers and men are interchangeable; the knowledge and experience now so valuable in civil life, were gained during the war, on service overseas; and the training carried on by the C.A.F. at Camp Borden, in flying, navigation, wireless, photography, the repair and upkeep of aircraft material and so forth, is of inestimable value to the Civil Branches. In return, the Civil Stations provide what elsewhere cannot be obtained—experience in administration, practical work in the field, opportunities for the development of initiative and resource. So it is that flying personnel required for purposes of defence, can be employed in time of peace in ways beneficial to the public; and Canada is fortunate in being able to make such extensive use of Civil Aviation,,which stands to the C.A.F. in the same relation as the merchant marine to the Royal Navy.

A Varied Usefulness.

As will be seen from the tabulated statements, each station has served many different Departments and undertaken work of many different kinds; but at each and every station, it may be remarked, most of the work has had to do with forestry. This is as it should be: so important to the future of this country is the conservation of our forests. There are, next to our farms, our chief asset. Their neglect and destruction threaten to have economic consequences disastrous to the whole Dominion, while their conservation will ensure prosperity for all time to come in those vast areas which otherwise would gradually degenerate into waste and barren lands.

"H. S. 2 L" Flying Boat—1 Liberty Engine, 400 H.P., used at following air stations: Vancouver, Victoria Beach, Man., Sioux Lookout, Ont., Ottawa, Roberval, P.Q., and Halifax.

The efficient administration of the forests of Canada is therefore of prime importance. Why have foresters turned so eagerly to aviation A study of their reports, and the articles published from time to time in this magazine and elsewhere, show that flying assists their administration in two most important respects—reliable information as to conditions throughout their territory, and immediate control of the forces at their disposal—failing which their work is hampered and oftentimes done in the dark.

The immense territories over which their forces are scattered, the paucity of present methods of communication and the difficult nature of the country to be traversed, make intercourse difficult and reconnaisance a long and arduous undertaking. The aeroplane or flying boat laughs at such difficulties; distance is nothing to it; journeys which formerly took weeks or months, are now completed comfortably in a few hours; forces can be moved from point to point over impassable country with ease and certainty and, above all, the exact conditions existing in any part of a reserve can be readily ascertained and immediately reported. This is what flying has done for the forester; nor is it too much to say that, though still in the experimental stage, it will make it possible, before many years are over, to bring under supervision and control the whole of the woodlands of Canada.

The work done from the Air Station at Vancouver for the Government of British Columbia was graphically described by Major Andrews in the last issue of this magazine; and nothing need here be added to his description, except to say that it is the earnest hope of the Air Board that his Department will continue to take advantage of the facilities provided at Vancouver Station, the cost which was in part defrayed by the Provincial Government.

For the Forestry Branch of the Department of the Interior, patrols have kept under constant observation the lower Fraser Valley, the Thompson Valley, and the Shuswap Lake District; while, further afield, many inspection and reconnaisance flights have been successfully undertaken. The district covered during the year includes Vancouver Island and the territory adjacent to the main line of the C.P.R., as far east as Revelstoke, and a sub-station has been maintained at Kamloops for work in the interior regions. The total flying time to October 31st was 438.15 hours, giving an approximate mileage of 32,600 miles flown. The machines in use were four HS 2L Flying Boats and one F3 Twin Engine Boat.

Flying in Alberta.

Passing eastwards to High River, Alberta, the work there has been almost entirely for the Forestry Branch of the Interior Department. Daily patrols have visited the Bow River, Clearwater and Crow's Nest Reserves. Wireless is used on the machines for reporting fires; and every fire in the reserve was in its early stages reported from the air. Patrols leave the Station daily—one month to the Clearwater River, the other south to the International Boundary. No patrol during the season has failed to finish its allotted task. The flying efficiency has been remarkable; it has enabled the Station to maintain an almost unbroken record throughout the year. A reconnaisance flight to Jasper Park was undertaken in September, with a view to ascertaining the feasibility of aerial patrols for fire protection in the National Park. Three days flying there enabled the Park Superintendent to cover all his territory and explore many parts of it never before visited. Aeroplanes only are used at this Station, five DH 4 machines being in service. Flying time 712.34 hours; miles flown 70,633, up to October 31st.

The Station on Lake Manitoba, at Victoria Beach, has given many examples during the season of the value of quick and easy transportation in undeveloped country. Hitherto the only methods of travel have been by canoe route or motor launch. Fire patrols by these methods are slow and uncertain, and the range of vision in a flat country is limited to the banks of the rivers and lakes traversed. With a flying boat this is all changed. Daily patrols covered the nearer regions where the danger of fire was most to be feared; and once a week throughout the season a machine made a 700-mile flight round the lakes, enabling the forestry officers to see for themselves an area of approximately 35,000 square miles. The route followed was north along the eastern shore of Lake Winnipeg to Norway House; thence south-westerly across the north end of the Lake to Grand Rapids; through Cedar Lake, south, down Lake Winnipegosis, to the town; thence eastward through the head of Lake Manitoba, across Lake St. Martin to Sturgeon Bay; thence southward along the western shore of Lake Winnipeg to the base. Inspection trips were made further afield from Norway House to Le Pas, and on to Cumberland House and the Carrot River Triangle. It is not too much to say that the advent of the flying boat in this district has revolutionized travel during the summer months. Flying was continued to well on in October. The last circuit of the lake was completed on the 10th of the month, some time after navigation by launch and canoe had become impossible. This trip was made under most adverse conditions through a series of blizzards; and it should suffice to show that the flying boat is not wholly a fair weather machine, but that it can meet and overcome climatic conditions which would defeat the craft now in use in these waters. The flying time to October 31st was 170.51 hours, covering a distance flown of 14,000 miles. Equipment, one HS 2L and two F3 Flying Boats.

Serving Ontario.

The mobile unit working from Sioux Lookout and from subsidary bases at Minaki, Allen Water, and Banning, has been engaged principally in forest survey and intensive timber cruising; though during the season at critical times, its services were called on for the transportation of reinforcements and supplies to fire-fighters. The work there has been done for the Forestry Department of the Government of Ontario, who have expressed their complete satisfaction with the results obtained. The whole country between the National Trans-continental Railway and the English River, Lac Seul and Lake St. Joseph, has been mapped in detail. Lakes and water courses have been sketched, and the different forest types have been shown under their various classifications. Barrens, muskegs and other natural features have been located, and now, after three months work, complete information is available regarding a stretch of country, 200 miles long and averaging 50 miles wide, regarding which only the most superficial information was previously available. Hours flown, 333.13; distance covered, 24,700 miles. Season, May 20th to October 12th. Equipment, three HS 2L Flying Boats.

TYPE OF MACHINE USED BY THE AIR BOARD.
"D.H. 4" Aeroplane—1 Rolls Royce Eagle VIII Engine, 360 H.P., used at High River Alta.

The station at Ottawa, established for research and experimental flying, has been fully employed throughout the season. In addition to research in photography, photographic survey, wireless telephones and other experimental work, photography of a practical kind has been undertaken, including a set of mosaics for the International Joint Commission of the St. Lawrence Waterway. To foresters, the operation of the greatest interest undertaken from this station was ten days flying in the Temiskaming region (for the Entomological Branch of the Department of Agriculture) where, over an area of many thousand square miles, an investigation into the spruce bud worm situation was carried out with satisfactory results. Flying time, 268.20 hours; mileage, 19,670, up to October 31st. Equipment, two DH 4 Aeroplanes, one HS 2L Flying Boat, and one Aero Seaplane.

At Roberval, Lake St. John, P.Q., the work of the Station established with the assistance and co-operation of the Province of Quebec, has been continued. The machines have been continually engaged in work for the forestry officers of that Government in the undeveloped territory north of the Lake, as far as Lake Mistassini. Flying time, 182.59 hours; mileage, 13,740. Equipment, three HS 2L Flying Boats.

The Station at Dartmouth, near Halifax, N.S., has been maintained as a repair and maintenance depot. Little flying is done from this Station; but several interesting operations have been carried out on a small scale for various Government Departments. No forestry work has been undertaken. Flying time, 54.25 hours; mileage, 2540; equipment, one F 3 and two HS 2L Flying Boats.

This completes the brief review of the forestry work performed throughout the Dominion during the summer months. Up to October 31st, the total flying time for all civil Stations was 2,160.37 hours, flown in 1,124 separate flights, and covering approximately 180,000 miles. The results obtained are most encouraging and full of promise for the future of Civil Government Aviation in Canada.

Better Machines Needed.

In considering them, it should be borne in mind that, to meet immediate requirements, Stations and material have to a great extent been improvised; and that, without equipment of the latest type, and without the expenditure of money on permanent buildings, the Air Board has succeeded in demonstrating conclusively that civil aviation has its uses in this country. The machines available are all of them war-machines of obsolescent types. Most of the Stations are merely on the banks of rivers or lakes—without hangars, workshop accommodation, or other conveniences. If flying under these conditions can produce such satisfactory results, there is no doubt that when machines especially designed have been obtained, and when permanent structures for their repair and accommodation are available, the results will be beyond all question.

The success of the work undertaken during the past two years is largely due to the spirit of friendly co-operation which has existed between foresters and airmen. Without it, the work cannot succeed; and the enthusiasm with which all engaged have worked together for the good of the public service, is a happy augury for success in the future.

Questions and Answers on Forestry

Q. Is Canada supplying most of the oak used for interior finishing in our homes and public buildings?

A. By no means. We now import the greater part of our oak, ash and elm from the United States. Hickory is also an imported article. These woods grew on our best agricultural lands and were the first to be destroyed.

Q. How much of Canada's lumber cut is used annually by Canadians?

A. Not more than one-sixth. The United States is our greatest market for forests products.

Q. Is Scotland planning to afforest her waste lands?

A. Yes, and is making excellent progress. Scotland has an acreage of 19 million acres. The existing reserve of woodland is just 650,000 acres. During the next ten years 125,000 additional acres will be planted with timber trees. The British Isles are enormous wood consumers and yet hold the smallest percentage of area under timber of any old-world nation except Portugal. A great programme of forestry is now under way.

Q. Is it true that Canada faces a timber famine?

A. Not true in the sense of a bread or clothing famine. There could be a timber famine with a general decay of our industries and decrease in population even though the casual observer could see plenty of trees about the country. Timber can only be profitably cut when in relatively dense stands. A few scattered trees do not make a stand and such trees would make enormously expensive lumber if cut. The present danger is that our forests are growing steadily thinner, the burnt areas are rapidly extending, and valuable species are disappearing. Canada needs constructive forest policies.

A river of logs—the raw material of Canadian pay-envelopes and the bulwork of export trade.

Q. How many forest fires, large and small, do we have in Canada in an average year?

A. Five thousand would be a fair estimate. Ontario alone had 1,269 forest fires this year, burning over 750,000 acres, and the Government spent $78,000 on fighting them. In the United States this year, more than 14,000 forest fires broke out in the pulpwood regions alone.

Q. What causes our forest fires; is there any means of preventing them?

A. Ninety forest fires in every hundred are started by settlers, railroads, campers, smokers, and other human elements, very few by lightning. These men require the timber areas to give them occupation or recreation, yet their personal carelessness is killing one of Canada's mightiest assets.

Q. Has not Canada the largest forest resources of any country in the world?

A. No. The United States possesses about three times as much timber as Canada, and Russia is regarded as much better endowed with timber than the United States of America.

A New Portable Fire Pump Proves its Metal

Some months ago an article was published in the Canadian Forestry Journal describing a new forest fire fighting appliance introduced in the Canadian National Parks. The appliance in question was a large rotary fire pump built into the body of an automobile. This outfit was developed for the purpose of promptly and efficiently dealing with forest fires along the highways in Rocky Mountains Park (Banff) and Kootenay Park which adjoins it where there is approximately 200 miles of motor highway. Naturally the highways are so largely used that there is constant danger of forest fires along their borders. The small portable fire unit developed by the Dominion Parks Branch some years ago has proved to be a very efficient fire fighting instrument but it was felt that insofar as highway work is concerned an outfit of much greater capacity and capable of self transportation was necessary to meet the special conditions concerning highways. The new unit developed being built into an automobile can be transported at high speed and therefore can promptly reach fires a long distance away. In addition it throws a stream of 125 gallons per minute as compared with the 20-gallon stream of the small portable unit.

The first unit of this variety has been tried out in the field during the past season and its success from the start has been so great that the Parks Service has already ordered one additional unit and has requests from the superintendents of every forest park for similar units.

The new engine has been tried out in half-a-dozen or more fires in Rocky Mountains Park. After the first fire at which it was used the following report was received from the Superintendent of Rocky Mountains Park:—

> "Last Sunday a fire started between the railway and the highway, about two miles east of Anthracite. Mr. Sibbald with the Fire Truck immediately proceeded to the fire. and water was turned on five minutes

TESTING OUT THE MOTOR FIRE PUMP, BOW RIVER, ALBERTA.
This Motor Pump was designed for Dominion Parks Branch, Dept. of the Interior.

after the truck arrived on the scene of the fire. In spite of its jumping the road in two places, the fire was easily kept under control and subdued in a very short period, the truck giving most efficient service and Mr. Sibbald and myself were highly delighted with the manner in which it worked."

"Mr. Sibbald states that he considers the Fire Truck to be easily the best means we have of fire fighting and he has nothing but praise for the manner in which it fulfils our requirements. I would ask that whenever favourable opportunity arises a second truck be secured for our use."

The reports regarding its use at later fires have been correspondingly enthusiastic. Every one in the Parks forest fire service is satisfied from the experiments at Banff this year that the new motor truck fire engine constitutes just as valuable a development in forest fire work as did the original portable unit.

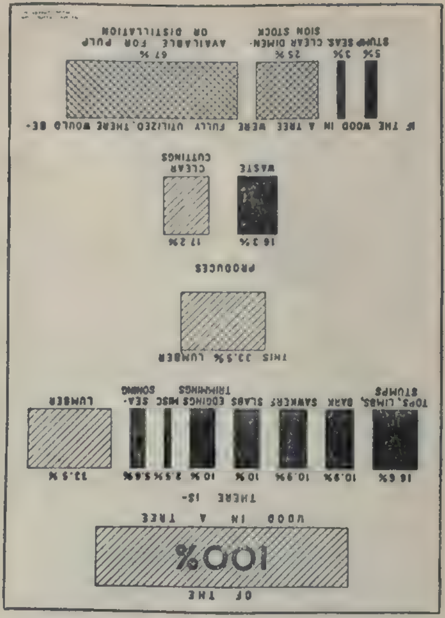
SPRUCE RESOURCES IN DANGER.

(*Toronto Globe.*)

That spruce is being crowded out of the forest areas of Ontario, Quebec and New Brunswick owing to methods of lumbering employed, is the verdict of Dean Howe, of the Faculty of Forestry, University of Toronto. In some places spruce is being cut down six times as fast as it can be replaced by nature.

Under the auspices of the Commission of Conservation, now abolished, Dean Howe surveyed more than 10,000 acres of cut-over pulpwood lands to determine the rate at which spruce and balsam were re-establishing themselves after logging. He established 25 acres of sample plots where conditions affecting the regeneration of the pulpwood species can be closely studied through a series of years.

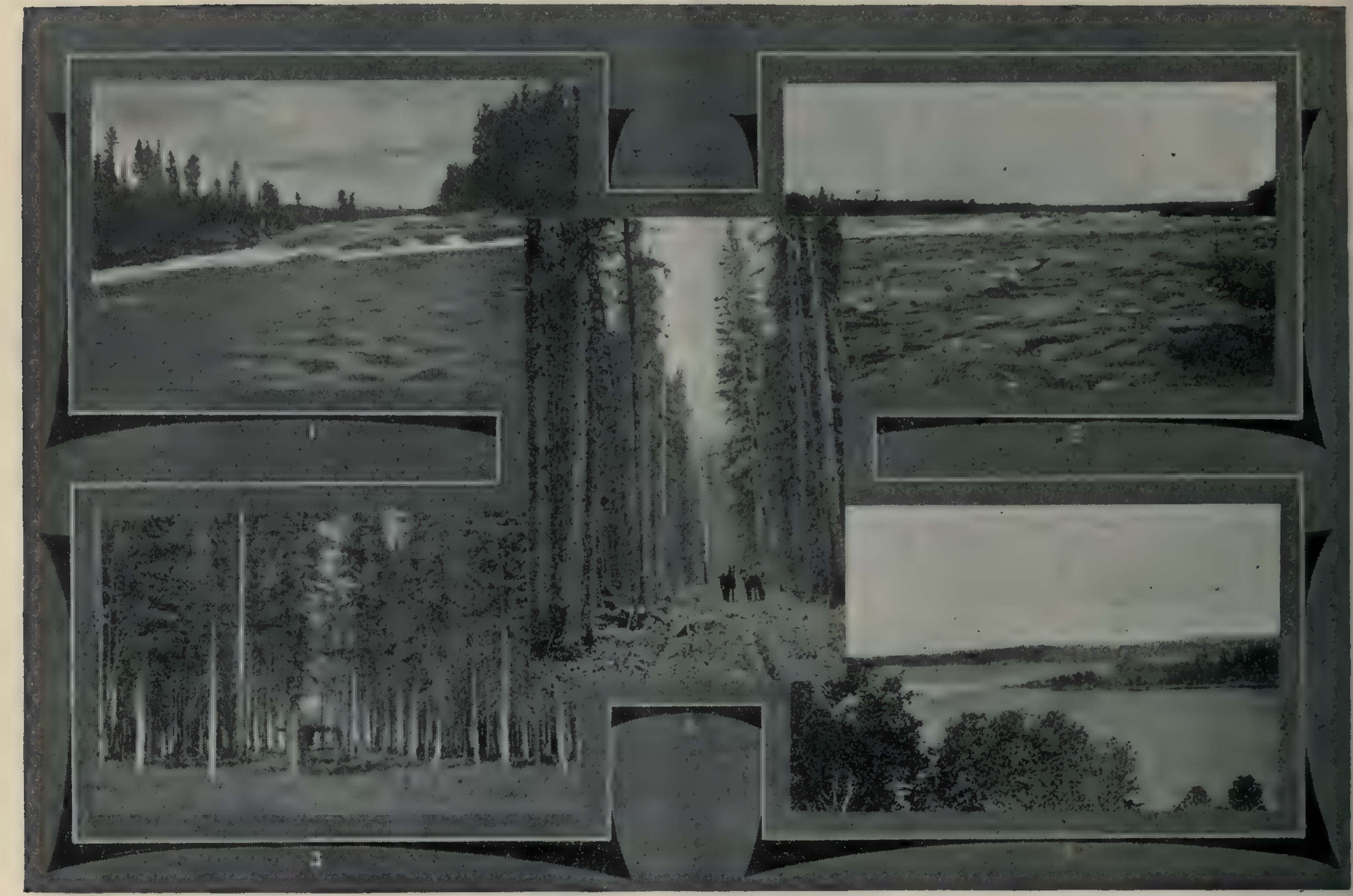
In co-operation with certain pulpwood companies more than 600 acres of experimental cuttings have been established. The idea of this is to find some modification of the present cutting methods that will increase the amount of young growth of spruce.



LUMBER CONTENT OF A TREE.

The National Association of Wood Turners, Inc., (U.S.) has issued the chart above to show the percentage of lumber and waste in the average tree. This chart assumes that the total content of the tree is 100 p.c. This total is understood to include such items as leaves, undergrowth, to be the practicable total, and does not etc. The studies of the Forest Service are followed as to the content of this practicable 100 per cent. The lumber wastes are taken from experience data of the National Association of Wood Turners, also the totals for salvage from slabs, edgings, and short or crooked logs. The total theoretical salvage possibilities were worked out entirely from basic data analytical derived, and supplemented by field studies.

View showing Pumper with suction hose in place.
Photo Country-Parks Branch, Dept. of the Interior.



(1) Scooping Rapids on Sturgeon—Weir River. (2) Rapids on Churchil River. (3) Pasquia Forest Reserve on line of C.N.R. (4) Spruce—Poplar type of Saskatchewan woods. (5) East shore of Amisk (Beaver) Lake.

A Journey to Strange Tropical Forests

By H. N. Whitford, Professor of Tropical Forestry, at Yale.

The beauty of a tropical forest is greatly over-estimated by dwellers in temperate climes. The testimony of nearly all travelers to the tropics is to the effect that no where did they see such an expanse of flowers and charming forests as those they had left, and they all complain of the monotonous greenness of the trees, which have never to prepare for winter. Where the trees are most immense and crowded, as in the Amazon district, and in the East Indies, the forest is lonely and silent, shadowy and sombre in the subdued light. The trunks rise without branches for many feet, tied together with creepers and lianes, in an indescribable confusion of festoons and ropes and cables, reaching from tree to tree, and to the ground; some flat, some twisted either around each other or smothering a tree; some limp and swaying, others drawn taut like the stays of a ship's mast. Many of them are climbing palms and many are armed with cruel fishhook-like thorns. The lianes, and the trees themselves, support myriads of small epiphytic or parasitic plants, ferns, fungi and countless other species. Overhead the forest is roofed by the tops of the trees and of the creepers; the foliage is sharply defined against the sky, even the finely-cut delicate leaves of the great leguminous trees characteristic of these forests. Nearly all the flowers of the deep forests are confined to this upper stratum, where the sun's rays can reach them, and they are not always easily seen, being often green or white, and inconspicuous amid the verdure.

How Tropical Trees Look.

The most tropical trees, moreover are, even, when brilliant, very fugacious; one reads of people walking through the maple leaves petals of a day, as through the maple leaves in autumn. The forest trees, however, are very prolific, and many of them bear bud, blossom, and unripe and mature fruit at the same time. The forest giants in some instances have protected themselves against the dangers of the great height and top-heaviness. Tapangs and figs have great buttresses like undulating wooden walls, others, as the screw-pines and the mangroves, perch on aerial roots, sent down from trunk and branches. The last are found along sea-shores, stepping far out into the water, backed by the screw-pines and nipa-palms and presenting an almost impenetrable front, woven into a thicket by interweaving creepers, interminably long and even thorny. It is at such edges of the forest, in clearings and along roadsides, that one sees the imagined beauty of the tropics. There the under-shrubs have a chance to grow and bloom, interspersed with graceful tree ferns and waving palms. The creepers and tree-branches descend and hang waving and blossomladen over the masses of ferns and ground plants; and there the brilliant blossom of orchid and parasite and epiphyte are visible.

African forests are often like those of temperate zones, with open glades and clumps of trees. One can hardly call the oasis of palms in the deserts, forests. In Abyssinia the country has been likened to the Scotch Highlands.

It is Australia, however, which has the most peculiar tropical forest, for in spite of the fact that her gum trees are the tallest trees in the world, it is a shadeless land. So burning are the sun's rays, that the leaves of the predominating eucalyptus are so disposed as to present always their edge to the sky; the acacias have delicate compound leaves, the ti-shrub has reduced its foliage to mere needles, and the wierd she-oak has dispensed with leaves altogether, string-like branchlets taking their place. The first impression of an inland Australian forest is one of monotony in color and appearance, and of burning heat and desolation heightened by the flopping strips of the bark of the gum-trees, which is cast away as northern trees shed their leaves.

The Forests of Our Far Northwest

By Ernest G. Whitehead, Ottawa.

FROM Fort Smith, which is the natural gate-way of the North, timber can be seen growing on nearly all the islands of any size and on both banks of the river system to McPherson, within the Arctic Circle. As one goes farther north, it is observed they dwindle in size and quantity. The greater part of this timbered area is composed of spruce, tamarac, jack pine, poplar, larch, birch, willow. As far as can be observed these woods extend back two or three miles on each side of the rivers and are of good size and in commercial quantities.

In the Mackenzie District white and black spruce attain a height of 80 to 100 feet, and in the majority of cases, are straight and furnish at least two logs to a tree of good size. Below Fort Smith, during the summer of 1921, in an area of about a square mile two hundred logs were cut, averaging forty feet long and ten to eighteen inches in diameter. Spruce is found in scattered groups, but generally, the groups are large. Annual rings numbering one hundred were quite common. This timber, protected from forest fires should be enough to meet the requirements of the country for many years, although its export as pulpwood should be restricted. The ground is a light soil with sandy subsoil including many swampy areas. In the valleys especially the white spruce attains its full development in size and quantity. The lower half of the Slave River is well wooded in this respect. The bark of the spruce is used as roofing for log cabins.

Christmas Day on the Athabasca River below Fort McMurray.

Jack pine is a purely Canadian tree having its southern limits in New Brunswick and extending across the country through the Northwest to Alaska. This tree attains the height of 100 feet, but not generally. The farther north its extension the smaller it becomes—finally decreasing into scrub. It is not well adapted to lumber, but is highly valuable for telegraph poles, railway ties and fuel. It is very prolific and whole areas of it are seen in the Mackenzie District. The sandy soil is especially adapted for its growth. It is noticed that after a forest fire that this species of pine is the first to spring up. This is accounted for by the fact that the heat of the fire bursts the cones from which the seeds fall. Jack Pine disappears entirely north of Bear River.

The poplar really constitutes the forests of the Territories, in many places. It is found in conjunction with other trees wherever they grow. "The balsam poplar inhabits the entire length of Mackenzie waterways assuming its greatest size on the Athabaska, Slave, Peace and Liard rivers. Below Simpson it gradually thins out and is of inferior size." Its wood has been used in the building of log dwellings but is better adapted for fuel, or pulp.

Forest Fires Needless.

A great enemy of the Northwest forest is fire. In most cases these fires are caused by pure carelessness on the part of the trapper, Indian or traveller, who do not see to it that their camp fires are extinguished. It is a commendable sign, however, in traversing these rivers and forests to see the various posters and warnings issued by the Dominion Forestry Branch, which call attention to the great danger of forest fires which destroy, not only the forest, but its wild life of every description. Too much propaganda cannot be used to constantly remind the people of the results of thoughtlessness in this respect.

The Tamarac is common to all Mackenzie District and generally leafs out before many of the other trees. Its habitat is in the swamps and muskegs. It is composed of a tough fibrous wood and generally used where such wood is required, especially as keels for boats, etc. It extends as far as the limit of the forest (barren land).

Northern Hardwoods.

The true hardwoods are extremely scarce in the Territories, with the exception of Birch.

According to an Hudson's Bay authority "The tract of country embraced by a line drawn west from the borders of the woods on the Anderson to the Mackenzie, southward, to Paeu de Livre river (Hare Indian river) at Good Hope is very well timbered."

ILLUSTRATED
Canadian Forestry Magazine

Published and owned by
Canadian Forestry Association,
Jackson Building, Ottawa, Canada.

SUBSCRIPTION RATES
With Membership in Canadian Forestry Association - - - $2.00 a year
Contributing Membership - - $5.00 a year
Life Membership - - - - - $25.00
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ROBSON BLACK, *Editor and Manager.*

EDITORIAL

The Christmas Tree.

I like that custom quaint and old
That makes the tree the emblem of
The reason when our hearthstones hold
So much of laughter and of love.
For trees, that from the dreary earth
To merry realms of blue arise,
Are links that bind our humble mirth
To God's great laughter of the skies.

Trees are our green ambassadors
From earth to heaven. In all lands
The tree God's grace divine implores
With lifted head, uplifted hands.
And he who looks upon a tree
Must upward look beyond, afar—
Shall in the selfsame vision see
Above the tree the sun, the star.

May we at Christmas learn the truth,
What man must be to be complete;
The little sapling in its youth
Strives for the heavens at God's feet.
And so must we, tho rooted here
On God's gray earth, still strive to rise,
And thru life's long and changing year
Still seek for heaven and the skies.

THE HIGH COST OF FISHING.

Fifty per cent of the forest fires in New Brunswick this year were set by fishermen.

This is too high a price to pay for a few strings of salmon and a pocket full of snap shots.

It means buying your sport at fifty dollars a day and your fish at ten dollars a pound; and letting the taxpayers of New Brunswick pay the bill.

Fishermen deserve their fun, but forests are getting too scarce to exchange them for a frying-pan of bass.

New Brunswick, and no other province, will stand for this sort of vandalism. Probably not a single fire caused by these fishermen was necessary. Probably every one resulted from neglected camp fires, from lighted matches, from tossing away lighted cigarettes. They had their fun and New Brunswick pay for it at so much an ounce.

The economic pillar beneath the Province of New Brunswick is timber. A square mile of forest is valued not because of the cubic contents of the wood growing thereon, but because of the capacity of that square mile to keep on producing successive crops of wood. No province in the Dominion can so ill afford to sacrifice its forest wealth as New Bruniwick.

Two methods may be suggested to teach the careless fishermen that fire is a vicious thing to fool with. He can be shown by educational propaganda. But that must be supplemented. An hour in police court, and a hundred dollar fine is a great tonic for sluggish patriotism. It likewise improves the memory and increases personal efficiency much better than a mail order course.

THE CHILDREN BOSS THE FUTURE.

Of the numerous channels of educational propaganda employed by the Canadian Forestry Association, perhaps none is more interesting to readers of this magazine than the Travelling Lecture Sets. At present there are in daily operation five such sets. Two tell the story of Canada's Forests and set forth graphically the need for conservation. One is a French language set, on a similar subject, which has been given a hearty reception by scores of schools in Quebec. Another relates the story of Old Ontario's deforested lands, the great tract of sand dunes and other barrens, how these have been afforested in certain sections, what the process is, the remarkable result achieved, and then goes on to give practical information as to the planting of barren lands with suitable trees. Another of the lecture sets is for use in the prairie provinces and is a complete and most interesting exposition of tree planting under prairie conditions. Any western resident who can resist the lure of tree planting after hearing the prairie lecture must have a hard heart indeed.

Each lecture set consists of fifty-five beautiful photographic reproductions in lantern -slide form, attractively tinted in natural tones, together with a complete manuscript containing an introduction and a series of descriptive paragraphs corresponding to the lantern slides. The outfits are packed in strong break-proof boxes in which the glass slides can safely travel thousands of miles without much risk of damage.

The Association first ascertains by correspondence the schools, churches, etc. with stereopticon equipment, willing to employ the lectures. Each lecture-set is then routed from Ottawa to the nearest applicant. On the inside of the box is a packet of ready-addressed labels with a route, so that after making use of it, each recipient merely attaches a new label, hands the case to the express agent and on the next day the set does duty in another community.

Tens of thousands of Canadian school children and adults have been given delightful and instructive hours by this form of instruction.

The Tree—Our Best Trade Agent

Until very recently the forest has been the great unadvertised member of Canada's family of natural resources. Note the following:

In Canada's trade with the United States in 1920 the forests of this country supplied products representing a value of $8 per head of Canadian population. Our agricultural sales to Uncle Sam were only $5.90 per head. Minerals were $4.50 per head, and fisheries $2.10 per head.

FIRST AID FOR FIRST THINGS

The forward march toward forest conservation in Canada is headed by Fire Prevention.

Fire Prevention has no competitor for front rank. All other participants lag miles behind.

Yet in the minds of thousands of Canadian business men, anxious to lend their aid to public forestry policies, the first thought of a sovereign remedy for Canada's timber depletion is the planting of trees.

Tree planting has its rightful place in forest replenishment, but as far as concerns our immediate economic necessities and the advancing of our public forest policies, one fact should dominate, viz:

The annual plague of forest fires represents Wholesale Devastation.

The planting of trees represents Retail Restoration.

This assertion has no critical bearing upon tree planting projects in themselves. It merely establishes the relative importance of the two forces, destruction and constructive, as it should properly appeal to Canadian business men and public administrators.

One ordinary forest fire, a year or two ago, destroyed enough timber in Manitoba such as could only be replaced by planting 14 million trees at a cost of approximately $140,000, and a wait of fully 50 years.

Another fire in Quebec this year destroyed 56,000 cords of standing spruce and 23 million board feet of pine. To replace that pulpwood by planting trees would require an immediate cash expenditure for nursery stock and labor alone of $8,206. with interest compounded for 50 years (the date of cutting) plus cost of fire protection for 50 years, and administration for 50 years.

Is not that a reasonable method of calculating the economic mischief wrought by just one forest fire that was not even reported in the newspapers by a two-line item?

To replace by planting the pine destroyed in the other fire, referred to, would take an immediate investment of 7,500 for nursery stock and labor, with interest compounded for 80 yeas (maturity) plus cost of fire protection for 80 years and administration for 80 years.

Let tree planting go ahead where conditions warrant—

But let us frankly face the fact that, in the nation-wide aspect of conserving forests, we cannot make headway until the Forest Fire business is "scotched".

Robson Black.

South America, The World's Greatest Reserve

The products of forests are usually divided into two great groups, as follows: (1) Major forest products, such as wood used for construction purposes and for special uses, as furniture, cabinet work, wood used for small articles of all kinds, etc.; (2) Minor forest products include firewood, tannin extracts, dyes, rubber, gutta percha, rattan, bamboo, wood oils, resins and various forest plants that produce medicinal products, like quinine, cocaine, sarsaparilla, epicac, camphor, etc. As a matter of fact, the value of these minor products of tropical forests consumed in the world's markets greatly exceed the value of the major products. Indeed, so great is the demand for some of the minor forest products that many of them have almost entirely become cultivated ones. Ten or 15 years ago while most of the rubber of commerce came from a wild forest tree of the Amazon valley, approximately 80 per cent of the rubber used to-day is from cultivated plantations of this tree in the Eastern tropics.

Kapoc is the commercial name for the cotton from the so-called cotton tree, and is a native of tropical America, but the chief source of this valuable product, used principally in stuffing mattresses, is from plantations in Java. Formerly the chief source of the Peruvian bark, quinine, was from the wild forests of Ecuador, Columbia and Peru. To-day most of the quinine comes from cultivated plantations in India and Java. The lack of cheap labor in the American tropics is the chief reason why these valuable products are cultivated in the Eastern tropics.

Because the climate conditions of temperate regions are not favorable for the production of many tropical minor forest products, the temperate markets must always depend on the tropics for most of them unless synthetic products can be substituted. While efforts made to produce synthetic rubber have not proved successful, yet the manufacture of synthetic dyes has greatly reduced the demands for the dye woods of the tropics, hence until the war greatly, but temporarily, stimulated the use of the tropical dye woods, the amount of these woods used in the markets it not likely to be greatly increased.

On the other hand tropical woods for

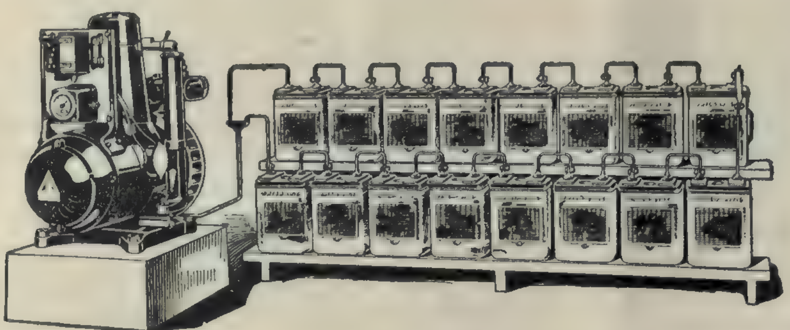
construction purposes have not been in demand in the great lumber markets of the world, the United States and Europe, principally because the forest of these regions have light timbers in large quantities that are better suited for general construction timbers than the so-called hardwoods of the tropics. The coniferous woods, or softwoods, of the temperate regions of North America, Europe and Asia stand in sharp contrast with that of the hardwood forests of the tropics. On the one hand coniferous forests occur in pure, or nearly pure, stands that make their lumbering on a large scale more profitable, hence the lumber industry has been highly developed; on the other hand the hardwood tropical forests are more complex in character and usually far away from well-developed industrial regions, hence capital has not been attracted to their exploitation on a large scale. Moreover, because of the great development of the lumber industry, especially in the United States, there has been an over-production; the surplus finds its way to all parts of the world and large amounts have been absorbed by the tropical countries. The contribution that tropical forests have made to the lumber markets has been woods for special uses rather than those for general construction purposes. Many woods of tropical countries are used locally for general construction purposes, that never find their way into outside markets. The study of tropical forests show that while they are more complex in composition than coniferous forests of temperate regions, yet this complexity is not so great as formerly supposed. The complexity is increased by the undergrowth trees that do not reach commercial sie. The trees that reach huge size and overtop the undergrowth species are composed of comparatively few species whose woods are little known. Also, a large percentage of these trees produce rather soft hardwoods that are easily worked. Thus, the estimated stand of timber in the Philippines is 200,000,000,000 board feet, more than 100,000,000,000 of which are light hardwoods that can be and are being substituted locally for many purposes to which imported coniferous woods were put. These forests also occur in sufficiently heavy stands to warrant the establishment of fairly large lumbering operations that will reduce the cost of their utilization. A recent estimate of the area and stand of timber in some of the large tropical forest regions is as follows:

Forest Region.	Forested area in million acres.	Stand of timber in billion board feet.
Southern Brazil__ __ __	260	650
Amazon Basin___ __ __	1,024	3,400
Northern South America	200	500
Indo-Malay Region__ __	320	1,600
Total___ __ __ __	1,804	6,150

The forested area of the United States is estimated at 550,000,000 acres, carrying a stand of timber of 2,800,000,000,000 board feet. Thus the Amazon region alone is estimated to have some 600,000,000,000 feet more than is found in the United States.

GROWING TIMBER ON THE FARM.

Timber is essentially a poor-land crop. Steep slopes, poor soil, rocky land, unusual corners, gullied and wooded tracts—all these afford opportunities for growing timber profitably. A careful survey of the average farm will reveal a surprising number of spots of this sort which can be utilized to advantage. If they do not already have trees, planting them with the proper varieties will materially increase the value of the land.



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Canada's Gravest Menace is The Forest Fire

One Million Square Miles of Precious Forest Destroyed by Canada in 75 Years. The Remedy is the People's Hands.

This article concludes Dr. Howe's contribution in the November issue under the title, "The Forest as an Automatic Wood Factory." (Originally addressed to the Forestry Students at Toronto)

WE have in Canada around 1,900,000 square miles of soil covered with forests. That is over a billion acres. A billion acres of forest, that is a wonderful heritage. Let us see how we have treated this great free gift of nature. When we examine this matter our pride is touched at once for we come right up against a fact that involves our obligations of citizenship and this fact is that we have allowed from two-thirds to three-fourths of our great forest heritage to be destroyed by fire within the past 75 years. Forest fires have destroyed the same logs on more than 1,000,000 square miles of good Canadian territory.

A million square miles in 75 years burned; total forested area hardly twice that amount. It is only a problem of simple arithmetic to realize what that means for our forests, if these ravages continue. That isn't all. It takes nearly 75 years to produce a stick of spruce pulpwood and nearly twice that length of time to produce a 12-inch spruce sawlog, under the average growing conditions in the forest. Suppose the destruction by forest fire goes on at its present rate, then make another simple arithmetical calculation from the above statement, and you will realize what may become of our spruce pulpwood and spruce sawlog supplies, even within the period when you are still active foresters.

Destruction by fire of Spruce, Peace River watershed.

Fires that Destroy the Soil.

There is still another, and more serious, aspect of our present forest fire situation, and that is the prevalence of repeated fires on the same area. There are undoubtedly many situations where one burning under proper control after the logging operations would improve the conditions from the standpoint of the next crop. It would accelerate regeneration both in time and in growth; it would remove many disease-spreading agencies and it would do away with the most dangerous fire hazard by the destruction of the slash. But the repeated burning of the same area is the great destroyer of future forests. The first fire may not destroy all the seed trees, but the second fire usually finishes the job besides killing the young growth that may have followed the fire. When both seed trees and the young growth have been killed there are no means by which nature unaided can re-establish the commercial species. After a few fires, the area becomes a man-made desert so far as the valuable pulpwood and timber are concerned. Thousands of acres of thrifty young growth are being transferred every year from the potential forest class to the desert class through the agency of the repeated fire. If we systematically kill the young growth of our commercial species, what can we expect of the future?

Fire protection is the most important problem in forestry policy to-day; in fact, it is one of the most important economic problems facing Canada at the present time. It transcends the tariff question in its its importance in relation to the future prosperity of the country, yet I doubt if you will hear it mentioned in any political speech.

I wish I had the power to use words that would sear your souls with the importance of forest protection. We have made great advances in this respect in the past few years, thanks to the untiring efforts of the Canadian Forestry Association and to various forest fire-fighting organiations throughout the country. Members of our own staff deserve much credit for their part in it, but even at that the present conditions cannot be allowed to continue if we are to keep our forests continuously productive and our lumber industries prosperous, industries that increase our national wealth by a half billion dollars a year.

Educate Against Fire.

I wish I could make you all missionaries to preach forest fire protection from the housetops, or better perhaps from soap boxes on the street corners because we will never accomplish adequate fire protection until public opinion is aroused on the subject to a greater extent than it has ever been done yet. You must help in educating the people to realize that every acre of forest land burned means a lost job for some one; you must help to educate the fool with his match out in the forest; you must help the railway corporations, especially the people's railways, to realize that burned forests mean reduced revenues; you must help educate the settler in the north country to realize that the lumberman's right to his purchased timber is equal to his own right in his purchased soil.

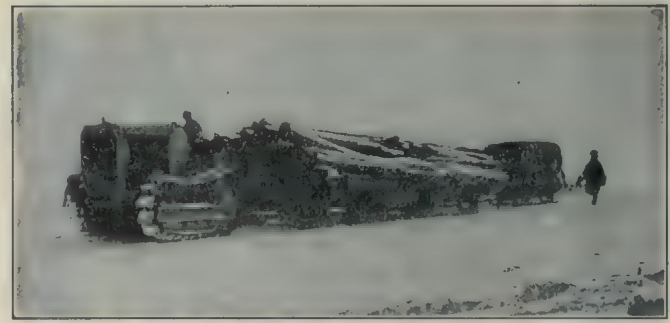
Forest protection then will be your most important work for the next few years,, but you will help solve other problems, all interesting and stimulating. You occupy a favored position in forestry. The men who have gone before you have been preparing the way for you. Their duties have been largely administrative. Now the price of lumber and the condition of markets are such that things can be done in certain forest localities that could not be done before. We are now on the threshold of intelligent management of our forests, the practice of forestry in the technical meaning of the word assuming, of course, that the present business depression is only temporary). You are to take part in the remoulding and recreating of the forest organism in guiding and directing nature's growth-energy to an extent impossible to your predecessors in the profession. As soon as you attempt to direct nature's forces in the forest you will at once come up against problems that will put a serious strain upon your gray matter. Suppose you are placed in a white pine forest. You know that white pine has contributed more to the wealth of the Eastern provinces than any other forest tree, but it is gradually passing out of the forest, even on areas that have not been seriously burned. The present logging methods create conditions unfavorable to the re-establishment of white pine forests. It is a very valuable tree because its wood is useful for many purposes and it grows quite rapidly. It would be good business to perpetuate it in the forest without resorting to expensive planting. How is it to be done? We don't know. That is one of the problems some of you must solve.

The White Pine Enigma.

Let us turn to the former pineries that have been burned. Some of them, as you know, have abundant regeneration, fine young stands of white pine of great promise, while an adjacent area burned at the same time is in the possession of poplar or birch with little or no pine. Why? We don't know. We may guess, but we really don't know. Some of you or your successors will solve the problem. A monument may be erected in Queen's Park some day to the man who devises a cutting method that will ensure an adequate natural regeneration of white pine in our forests, this in spite of the fact that he won't need such a monument. The gratitude of generations of lumbermen will be his monument, as well as the white pine forests he will leave behind, for they will go on long after mere bronze or marble in Queen's Park has crumbled to dust.

Suppose you were placed in a pulpwood forest. You know the story of the cut-over pulpwood lands, how the spruce, undoubtedly furnishing the best wood for all round pulp and paper purposes of any tree in our forests, is being gradually crowded out by inferior species. It will be your problem through your knowledge of its biological relations, its seedbed requirements, its light requirements, its soil requirements to reinstate the spruce to its former position in the forest. The pulp and paper industry adds around $100,000,000 to our national wealth each year, besides distributing about $30,000,000 in wages. The principal source of supply is spruce, yet the commercial supply is fast disappearing. It is going the same way white pine has gone in our forest. The man who can devise a logging method, fair to the operator and fair to the people, the owners of the land, that will ensure the establishment of successive crops of spruce, may, also, have a monument erected to his memory this time in front of

JT TRACTORS



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the House of Parliament at Ottawa. His descendants may accept the honor with becoming modesty, but his most enduring monument will be the gratitude of countless generations of pulp and paper manufacturers and workers throughout the Dominion.

Replanting in Old Ontario.

It may be that you will be called upon to help recreate forests by artificial methods on areas where the possibility of natural regeneration has been destroyed by abuse or mismanagement. There are close to half a million acres of waste lands in Old Ontario that could be very profitably brought into tree-bearing again by artificial reforestation. These areas are very near local markets and so will be reforested first, but when that is done there would still remain a half million acres of old pineries in Central Ontario, areas that in the past have borne 10,000, perhaps 20,000 feet of pine per acre, that have been burned and reburned until all the young pine growth has been destroyed. The pine forest will have to be recreated by artificial planting if it ever exists again on those areas. In the not distant future, generally speaking, products from planted forests will contribute to the supply of local markets, and some of you will have the satisfaction of creating those forests.

So I might go on outlining your problems in the forests north of the prairies, on the East Slope of the Rocky Mountains and in British Columbia. They are fundamentally the same everywhere. The creation of a forest by guiding and directing tree growth—energy for the purposes of continuous public service, in order that industries which touch the economic life of the nation in almost every phase may be always maintained in a prosperous condition. What would it mean to Canada if all our twelve hundred million acres of absolute forest soil were fully stocked with commercial trees, adequately protected

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from fire and managed for continuous production? What would the resources from such forests mean in terms of reduced taxation, in furnishing the fiinancial aid in the building of highways, the endowment of schools and universities, the founding of hospitals and libraries? You see, you are to be important factors in the effort to lead your own country into the path of its higher destiny. Unless you have this vision and faith in the ultimate success of that vision, you will have failed in the duty of your profession and in the obligations of citizenship.

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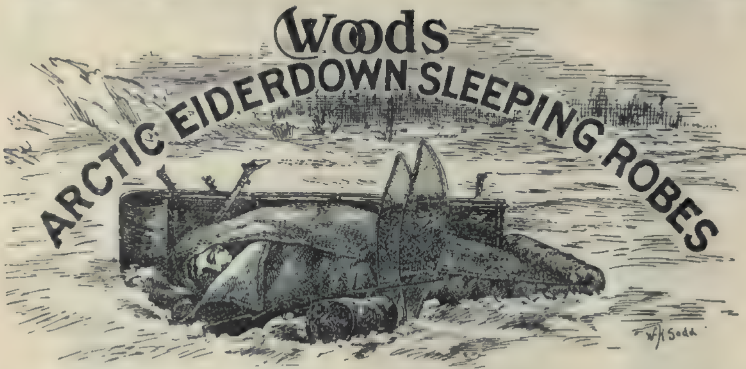

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PRAIRIE TOWN PARKS.

(Concluded from p. 517.)

The grass should be Kentucky Blue and it should be sown thickly with about a fifth of white clover. The grass should be sown first and the clover after. After being raked it should be rolled if possible. Weeds will appear the first summer but if they are kept cut off with a mower the first year they will trouble very little afterwards.

After the tree groups are from eight to ten feet high, which will be in three years, there will be no further need for cultivation but it will then be an additional assurance for good growth to cover the ground underneath the trees with straw, 8 to 10 inches deep to keep in the moisture. In doing this, the branches must not be trimmed off. They must be allowed to remain until they drop off naturally. No artificial pruning is allowable in these forest islands.

Somebody will some day come along and suggest pruning or thinning, and whoever is in charge then may be inclined to do it, but if he does, he will undo all the work already done and your park will revert to a condition similar to what it is in now. You are growing, not **trees**, but a number of miniture forests and they must be managed accordingly.

Making the Walks.

After the trees are all planted, the walks should be pegged out ready to be made. The easiest way to do this is after the walks are pegged out, to plow along the line of the pegs, using a rolling coulter if possible to cut a clear furrow and throwing the earth into the walk. Three or four inches deep will be quite enough.

The grass edge bounding the walk must be sharp and a clean clear furrow is essential, and while the clean sharp edge can be restored with the spade, the less of that the better as it takes time. It should of course be dressed with the spade. After the furrows are made the centre of the walk should be rounded up by using a—V—along the furrow throwing the loose soil into the middle.

The —V— is made of 6-inch plank as per the sketch enclosed. It makes a fine job and saves a lot of work.

Care of the park after the trees require no further cultivation and the grass is grown.

The finish of the park is everything and no matter how well your trees and grass are growing it will never have the pleasing appearance it should have unless the edges of the tree groups and the walks are kept trimmed. These should be gone over once a year with a half-inch turf iron. It will not take more than a day or two to do, and perhaps even need not be done every year. But it should be borne in mind.

Then the grass should be cut. Nothing looks better than a well trimmed lawn, and nothing looks worse than a ragged one. Lawn mower cutting is an expensive item however, and a run over twice a year with an ordinary farm mower will do very well. Perhaps, before some big day, a lawn mower can be run along the edges of the walks and the islands, say a yard or so wide. This will make a wonderful difference in the appearance of the park.

A TREE FOR A TREE.

Some people think there should be a law to compel loggers to plant a tree for every tree cut down. As it is necessary to start five or six seedling trees to secure one full grown forest tree, straight, tall, and without limbs, such a law would not work. Besides, the application of silviculture methods, the forest engineer endeavours in many cases to coax Nature to reforest cut-over tracts herself, and to plant only as a last resort. In view of these facts what the laws of some European countries do demand in regard to certain non-agricultural lands is: "Start an acre of young forest for every acre cut down."

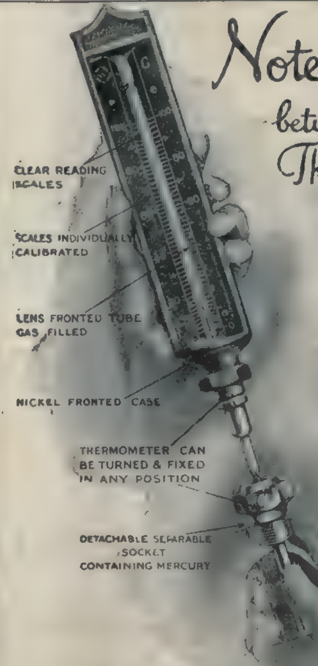
AIRPLANES AND FOREST FIRES.

Recently the initial trip was made from Kamloops, British Columbia, of a new airplane which had been flown up from Vancouver to be used in patrol work over the forests in that district administered by the Dominion Forestry Branch. The machine in use earlier in the season was returned to Vancouver for overhauling. The new plane was piloted by Major McLaurin of Vancouver, and with him on this trip were Mr. D. Roy Cameron, district forest inspector, and Mr. J. A. Wilson, of Ottawa, secretary of the Air Board of Canada. The trip of 250 miles was made in three hours and twenty minutes. There had been a smoke haze for some days, which had made detection of fires from the lookout stations difficult and the use of the airplane with its greater range of visibility overcame this. No fires which Forestry Branch officers did not know of were discovered but from the airplane the fires were classified according to their size and importance that suppression measures could be directed accordingly. In fact so detailed was the observation carried out by the district forest inspector that those in the plane could see the fire-fighters clearly and the kind of work they were doin.g.

Prince of Wales Afforests His Waste Lands

(From a Sketch in the London Times of the Duchy of Cornwall)

The tramp down hill to Fenworthy brought us through part of the newly-planted ground, while rows of young larches and spruces on the opposite side of the Assycombe Brook could be traced in the distance. It was noticed that failures were not uncommon, but an estimate of 10 per cent. indicates that the trees suffered only lightly from the ravages of the drouth, for in many planta-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tions a 50 per cent. loss has occurred. The planted or plantable areas are of peculiar shape. because observance of the 1,500-foot elevation limit excludes many parts that otherwise would fall conveniently and symmetrically within the scope of the scheme. In fact, there are constant reminders that even the more accessible and residential parts of this expansive plateau are near the height above which afforestation ceases to be a commercial proposition.

"The Duchy scheme embraces about 5,000 acres, of which 400 acres have already been planted. The nurseries were formed as part of the enterprise for reasons of economy, and they have proved a saving and a success. The young larches and spruces raised here cost less than the transport of plants introduced from other suitable sources, and they have been equally adapted and healthy. The nurseries, which are under the immediate direction of Captain Hale, are still limited in extent, but they are advanced sufficiently to be of marked economic advantages in the development of the local enterprise, while there are definite prospects of wider benefits in later years. They are managed on modern principles, and the equipment for expediency and economy in every detail is complete."

THE FORESTER AND HIS WORK AS A CREATOR.

From an Address to Forestry Students of the University of Toronto, by Dr. C. D. Howe.)

One of the greatest enduring satisfactions of life is to be a creator, but it is still greater satisfaction to guide the development of that thing which you have created. That is the greatest satisfaction in a farmer's life, and that will be the greatest satisfaction in your lives. The beautiful and wonderful thing in your profession is that you will take this plastic, mobile life-unit, which we call a forest, and fashion it to meet your ideal; the largest quantity of the best quality of wood for the purposes desired. I can't pass by this point without elaborating it a little; it always seems so wonderful to me. Why is it that forest trees can form such a highly organized community, so sensitive to the slightest changes in climate and soil conditions, and consequently so easily moulded by the hand of man? It lies in their mode of growth. Each annual ring of growth, together with the new leaves that appear every year, are new colonies of cells, a new generation of life. When the conditions of life in a forest have changed for any tree, when, for example, it became a suppressed tree instead of a dominant one, the new cells of the growth of that year became adapted to their new conditions. The same is true when a suppressed tree, through some accident to its neighbors comes into the full enjoyment of light. The last annual growth is at once capable of taking advantage of the new situation created in the forest. So long, then, as the tree can form annual rings, it possesses the plasticity and the adaptability to meet the condition imposed upon it by its neighbors. That little growing layer under the bark is a wonderful thing! If we seek still farther for the cause of the plasticity and adaptability of forest growth, we would find it in the living matter contained in these annual new colonies of cells, the substance we call protoplasm. It is because the protoplasm has the power of receiving impressions from without and of reacting to those impressions that we have plasticity in plant life. Were it not for this irritability of the protoplasm, we would have no growth, no differentiation of structure, no evolution. Were it not for this, we might still be little blebs of jelly sucking up mud on the bottom of the primordial seas.

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It is then through the agency of this living matter that you are to be the creators of a forest and that you are to guide the development of the thing you have created until it meets your ideals: every acre of forest soil occupied by wood valuable for some purpose.

THE BONES OF THE AIRPLANE.

It has been truly said that tough flax fibres are the feathers of the airplane, and with equal truth it may be affirmed that the bars of Sitka spruce wood are its bones. Think what airplane designers and flying men demand of the bones of their planes! They must be light, strong, stiff, and tough, and above all every stick must be dependable. After trying many things, airplane designers settled on Sitka spruce (Picea sitchensis) as the ideal material. This wood is found chiefly in British Columbia, from which a large supply was drawn during the war. The war was, in fact the cause of the introduction of Sitka spruce to the public, and since that time this wood has had an extended use in other lines of industry for which experience has shown it to be suited. The Forest Products Laboratories of Canada have prepared and the Forestry Branch of the Department of the Interior has issued a bulletin embodying the record of thousands of tests of this wood. It is entitled Bulletin No. 71 "Sitka Spruce; Its Mechanical and Physical Properties." Copies have been sent to those most directly interested and any person who desires a copy, but has not yet received one, will be supplied free, upon application to the Director of Forestry, Ottawa.

THE OAK.

A little of thy steadfastness,
Rounded with leafy gracefulness,
Old oak, give me,—
That the world's blast may round me blow,
And I yield gently to and fro,
While my stout-hearted trunk below,
And firm-set roots unshaken be.
—Lowell.

Lumbermen, Fishermen and Campers will find in **BETTY BRAND** Condensed Milk a quality unexcelled.

It is not made from separated milk, but from full cream milk, thus containing the whole of the original fat.

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Empire Association Gets Under Way

London, Nov. 16—At the inaugural meeting of the Empire Forestry Association at the Guildhall to-day, a resolution was passed urging the early extension of a constructive forestry policy to all parts of the British Empire, for the purpose of scientific conservation and prudent exploitation for the benefit of the Empire. Sir George Perley seconded the resolution.

Lord Lovat stated that the aim of the association was to federate the voluntary associations and individuals interested in the Empire's timber supply, thus pooling the resources of their knowledge.

Hon. F. L. Wood, M.P., Under Secretary of State for the Colonies, had recently refused to permit a reduction of the forestry staffs in two West African colonies. Mr. Wood, emphasizing the vast timber resources of the British Empire, said that 250,000,000 acres of timber were available for sawing in Canada. He said he was a heartfelt believer in doing everything possible to develop the use of Empire-grown timber within the Empire.

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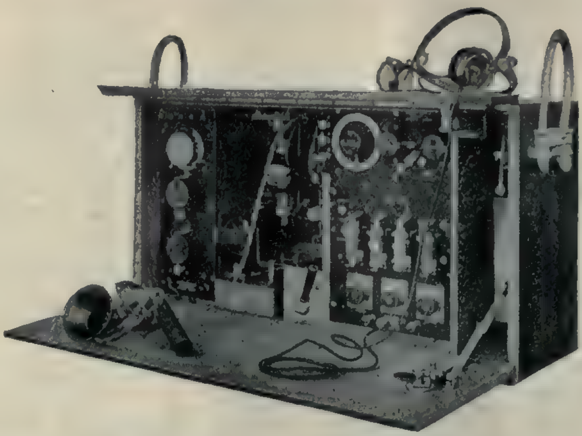

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It has a proud record of service, covering more than a quarter of a century.

On many a roof the limit of its endurance has not yet been found after more than twenty years of duty.

Inborn quality, from the surface to the centre, is what gives RU-BER-OID its character.

We would suggest you consider this, for your own benefit, when planning to purchase a roof covering for that new or old building.

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For lining Steam Boiler Furnaces, Dutch-ovens and wood Burners, without a high-priced bricklayer.
Will last longer.

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Will pack anything. All sizes out of one can.
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TRANS-CANADA ROUTE.

In response to a request received from Sir Ross Smith, the Civil Aviation Branch of the Air Board has recently mapped out a combined aeroplane and seaplane route across Canada from Kodiak Island, Alaska, to St. Johns, Newfoundland, which it is proposed should constitute the Canadian section of the "Round-the-World" Flight. It is understood that Sir Ross Smith will attempt this flight in the near future, using a machine of amphibian design which will be able to alight and take-off equally well from either land or water.

The project is one which it is felt the Canadian public will naturally take a keen interest, in view of the fact that the success of such an undertaking would undoubtedly do much to pave the way for the establishment of a greatly accelerated trans-ocean communication service by air between Canada and other units of the British Empire. The proposed all-Canadian route, with approximate distances, is:—

Route.	Approx. Distance. Miles.
Kodiak Island, Alaska, to Wrangell, Alaska	700
Wrangell to Prince George, B.C.	450
Prince George to Edmonton, Alberta	450
Edmonton to Moose Jaw, Sask	450
Moose Jaw to Winnipeg, Man	400
Winnipeg to Fort William, Ont	385
Fort William to Sault Ste. Marie, Ont.	280
Sault Ste. Marie to Montreal, P.Q.	525
Montreal to Fredericton, N.B.	455
Fredericton to Sydney, Cape Breton	360
Sydney to St. John, Nfld.	420
	4,875

THE HOUSE THAT JACK BUILT.

This is the house that Jack built.

This is the lumber, all shaven and sawn,
That was used in the house that Jack built.

This is the tree, so tall and so strong,
That furnished the lumber, all shaven and sawn,
That was used in the house that Jack built.

This is the forest, so broad and so green,
The home of the tree so tall and so strong,
That furnished the lumber, all shaven and sawn,
That was used in the house that Jack built.

This is the match, so neat and so small,
That was thrown by a gink without thinking at all,
Down into a brush heap, lighted and all,
And burnt up the forest, so broad and so green,
The home of a million trees, stately and strong,
That would furnish the lumber, if shaven and sawn,
For thousands of houses like Jack built.

FRED H. BYSHE,
Dominion Forest Service.

Triumphal Tour of Forestry Cars in Quebec

On the recent tour of the Forest Exhibits Car and the Forestry Lecture Car of the Canadian Forestry Association south of the St. Lawrence on the C.N.R. and Quebec Central railways, the number of persons attending the forest protection lectures and visiting the Exhibits Car reached a total of 38,731.

This makes over 140,000 persons reached this season through the novel and impressive method of the Canadian Forestry Association's railway cars.

Following are interesting items from the daily diary of the cars:—

November 14th, River Manie—Held evening lecture on forest protection in church which was packed to the doors. Most of these people were men from the surrounding camps.

November 15th, Monk—During afternoon 300 school children and 200 adults visited Exhibit Car. It took two lectures to cover evening audience which totalled 400 people.

November 18th, Megantic—At 3 p.m. had 172 pupils and 4 teachers from English school. At 4.30 p.m. the priests arrived with 500 boys from French school. At 8 p.m. lecture given in town hall was packed to the doors by approximately 750 men and women.

November 19th, Courcelles—In addition to big crowds at the Exhibits Car three evening lectures had to be given to accommodate the audiences. On Sunday at Courcelles nearly 2,000 people visited the Exhibit Car.

Nov. 28th, Thetford Mines—During afternoon had 1,000 students from schools, with 500 adults. During evening, 900 persons passed through Exhibit Car.

At 8 p.m. at College Hall gave lectures to 1,500 people, and from 10.30 to 11.30 p.m. another 400 passed through the Exhibit Car.

Nov. 29th, Disraeli—In afternoon, 300 boys, 400 girls and all teachers in district attended, with 800 others. Gave motion picture lecture to 200 older boys at 3 p.m. During evening had over 1,000 persons at lectures.

Dec. 1, East Angus—Splendid arrangements made by kindness of Mr. J. A. Bothwell and Mr. S. Osborne, of Brompton Pulp and Paper Company, so that big attendance was assured.

At 3 p.m. had 300 English school children.

At 4.30 p.m. had 350 boys from French school.

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...and...

LUMBER OF ALL KINDS

At 8 p.m. local hall was packed to overflowing with adults. Usual lectures and motion pictures given.

More than 2,100 people during the afternoon and evening visited the Exhibit Car.

Following day had audiences of convent children totalling 550 and had another 1,000 persons at the Exhibit car.

The foregoing daily experience are typical of the public response to the Canadian Forestry Association's educational efforts in forest protection.

Viscount Bryce on Canada's Progress

(From "Canada—An Actual Democracy.")

"Has Canada been behind other countries in dealing with social reforms, with labour controversies, with tariffs, with the systematic development of national resources?

It must be admitted that the right method of conserving and developing natural resources either has not yet been found or that it has not been properly put in practice, though no subject is more essential to the welfare of a new country. Here the problem is threefold. The aims generally sought have been (a) to provide the maximum of facilities for turning forests and minerals to the best account, and for the transportation of products: (b) to prevent the absorption by speculators, for their own gain, of these and other sources of natural wealth; (c) to secure for the nation, so far as can be done without checking individual enterprise, the so-called "unearned increment" or additional value which land, minerals, and water power acquire from the general growth of population and prosperity."

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Forest Fires Take Away Jobs!

SIZE UP EVERY TIMBER FIRE AS YOUR PERSONAL ENEMY
AND GET AFTER HIM.

—— Put Out Your Camp Fire ——
Never Toss Away a Lighted Cigarette

There are hundreds of jobs in a live forest.
Dead forests drive out population.

This advertisement inserted in the interests of forest protection by

The Spanish River Pulp & Paper Mills, Ltd.
SAULT STE. MARIE, CANADA

NEW FOREST PROTECTIVE BODY.

The Anthracite Forest Protective Association, operating in nine counties of the anthracite coal regions of Pennsylvania and having its office in Lansford, Pa., has appointed J. M. Sloan to the position of Secretary-Treasurer. Mr. Sloan is a graduate of the Faculty of Forestry, University of Toronto, class of 1915.

The Association, which is a non-profit organiation of timberland owners, is co-operating with the Pennsylvania Department of Forestry in the prevention of forest fires. Its influence extends over a large district which contains approximately 500,000 acres of forest land. Active membership represents over 97,000 acres of forest. The membership includes small farmers, coal corporations, water companies and lumbermen. A large number of interested persons have been elected to associate membership. Several steel look-out towers have been constructed and connected with telephones by the Association. A large part of the work done is of an educational nature and the people of the region are beginning to realize that each individual has a distinct responsibility in preventing forest fires.

FOREST SCHOOL FOR NEW HOME.

The faculty of Forestry at the University of Toronto is next in line on the building and extension scheme of that institution. The converted residence at present in use on Queen's Park is now insufficient to meet the combined needs of the faculty and of the department of botany which share in the space there. Further, the greenhouse is now quite inadequate to meet the demands made upon it, while the experimental garden was recently cut in half, to make space for the new Psychiatric hospital. Several sites have been considered for the Forestry department, but no action has been taken so far.

THE SURE FOUNDATION FOR A BETTER CANADA.

How the Canadian Forestry Association has Served the National Interest.

1. Secured important forest protection laws and brought about more effective administration by Governments.
2. Aroused public interest in all parts of Canada in the vital problem of forest conservation.
3. By means of eighteen branches of educaiton propaganda it has brought essential information to hundreds of thousands of school-children, Boy Scouts, teachers, clergymen, settlers, railroad men and other classes.
4. It has fulfilled its responsibility as the standard bearer of organized public opinion by making Forestry a **national cause,** and making the aims of Forestry intelligible to every citizen.
5. It has put first things first and has insisted upon Forest Fire Prevention as the immediate and paramount problem in forest conservation.
6. It has spread the knowledge of forestry progress between Governments and private companies, and thereby has served as a clearing house of ideas.
7. It has established and maintained a Tree Planting Campaign in the prairie provinces with expert demonstrators and lecturers visiting hundreds of treeless communities with the Association's Tree Planting Car, fifty thousand prairie residents attending the lectures in 1921.
8. It has stimulated reforestation of barren areas in Eastern Canada and has given constant aid in the solving of shade tree problems by individuals and municipalities.
9. It has carried a graphic educational campaign in forest conservation to 100,000 people in Ontario, Quebec, New Brunswick and Nova Scotia during 1921 through the Forest Exhibits Car, with two lecturers in charge.
10. It has presented to scores of thousands of Canadian voters the common-sense reasons for forest protection, not only as a safe-guard to the existence of the wood-using industries, but as an insurance policy on farms, fisheries, mines and manufacturers, transportation systems, etc.

The Association has worked from coast to coast to lay a foundation of intelligent ideas and ideals upon which our Provincial and Dominion Governments may safely construct more comprehensive and effective policies of forest conservation.

WHAT WE HAVE YET TO DO.

Make Forest Protection the personal policy of every Canadian patriot.

Make tree planting the unpostponable business of every prairie settler, in order to improve crop conditions, minimize wind damage, beautify home surroundings and thereby stabilize prairie population.

Make reforestation of waste lands in Middle and Eastern Canada a first concern on the part of municipal and provincial governments and individuals.

Win the personal interest of all farm

MADE IN CANADA
EDDY'S
SILENT MATCH
NON POISONOUS
CHEMICALLY SELF-EXTINGUISHING
NO FIRE LEFT WHEN BLOWN OUT!
THE E.B. EDDY CO. LIMITED
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After Glow

Safe as matches can be made are the matches in this box. EDDY'S "Silent Fives"—they strike when you want them to without dangerous flying heads or fire-creating sparks, and go out completely when blown out without the least After Glow.

In addition to "Silent Fives" there are some thirty to forty other varieties of EDDY MATCHES—every one as perfect a light as seventy years manufacturing experience can produce.

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children in improving their home supply of timber through planting up the barren portions of their farms with trees, and in woodlot improvement.

Create a national Forward Movement in forest protection of sufficient intensity to bring about public policies adequate to meet the economic needs of the nation.

IT takes 65 muscles of the face to make a frown, but only 13 to make a smile - - - Why waste your energy? KEEP SMILING.

A Farmer-Forester With a Great Record

While at times it may seem that few farmers are interested in forestry or the growing of a wood supply on their holdings, as a matter of fact thousands of Canadian farms display such an interest applied with great intelligence and foresight.

A unique demonstration may be found on the property of Mr. E. Terrill, at Floral Hill Farm, Northumberland County, Ontario, Mr. Terrill has the true forestry instinct and although his place is ten miles from a railroad and not apt to be visited by many, he has achieved results that deserve the widest advertising. The following description is by the agricultural editor of the "Toronto Globe."

More than history has been made on the Terrill farm. One of the best practical demonstrations in farm forestry that I have seen anywhere in the Province has been given there. Forty-four years ago 300 Norway spruce seedlings, packed in a box about the size of those which raisins were formerly sold in, were received from an American nursery. These were transplanted with a space of three inches between each seedling. The next year they were again transplanted and a third transplanting took place in the following season, the young trees in this last planting being properly spaced for permanent growth.

"Each time the seedlings were moved roots that showed a tendency to wander were cut off." Mr. Terrill said, "and I have always contended that, if you want to get a really satisfactory growth, this course should be followed. At no time were the seedlings exposed for more than a few seconds to the air in transplanting, and at no time was there any evidence of a check in growth by moving."

75 Ft. High, 10 Ft. Around.

That growth was not checked is made clear by the appearance of the trees today. Located on the elevation for the purpose of providing a wind-break for the Terrill orchards and buildings, they are the most prominent feature in the landscape for miles around. The height is about 75 feet, and one of the trees, measured three feet above the ground, while I was there, showed a circumference of 10 feet.

It might be observed in passing that the extra care taken in transplanting and root-pruning was justified in this case because comparatively few trees were being dealt with and appearances called for perfect growth with each tree. Such care is, of course, impossible where a wood-lot is being planted and thousands of seedlings are being used. Neither is it necessary in that case because a large number of trees have to be weeded out after a few years have passed, and in thinning only well-grown trees need be left.

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Nature Helped Here.

There is, however, something still to add regarding this Terrill wind-break. In course of time the seedlings of nearly half a century ago began to produce seeds themselves. Many of these seeds fell on soil parent stems and prepared for them by a covering of needles, and the seed, planted by nature's own hand, soon produced a fresh crop of seedlings. These were used in replanting a second row parallel with the parent trees, and now there is a double windbreak, the younger trees having already attained a height of 20 feet.

A 25-acre Woodlot.

Nor does even this exhaust the story of Mr. Terrill's practical demonstration in farm forestry. On his farm of 180 acres 25 acres is in permanent bush.

"Do you let the cattle run in that bush?" I asked.

I knew what the answer would be before the question was put, but was nevertheless gratified by the emphatic manner in which the "No!" was pronounced. A man who loves trees as Mr. Terrill does, and who realizes the value of a permanent woodlot as he realises it, can be depended on to see that cattle do not destroy the young seedlings.

With all this, Mr. Terrill is an all-round good farmer. Trophies modestly shown in the living room prove this. A silver cup was won for the best managed dairy farm in one of four districts into which the Province was divided for purposes of competition. A shield was won which recorded the further fact that the Terrill farm stood third in a province-wide competition of the same kind.

TREES NEEDED FOR THIS DISTRICT.

(A letter to the Can. Forestry Assoc.)

Melita, Manitoba, Dec. 1, 1921.

"I have spent five months in the South West corner of Manitoba. Few no doubt are aware that this district has had six crop failures in succession due to hot wind, drought, etc. Several farmers have expressed their wish to procure quick growing trees for planting around their buildings, farms, and some are going to plant rows up through the fields. If you could give me information where these trees might be procured I would be greatly obliged.

"I have convinced myself that an extensive tree planting scheme for this area is the only solution to prevent these hot winds from destroying the crops. If you are interested or could give any suggestions or assistance re tree planting in this district I would be glad to hear from you. I feel confident that some tree planting scheme should be adopted. I know this that the farmers are ready to assist."

Henry Ford Applies His Genius to Forestry

Henry Ford, manufacturer of the popular-priced motor car bearing his name, has turned his attention among other things to a practical method of forest harvesting. According to a report from Iron Mountain, Michigan, Mr. Ford is experimenting on a section of timber land two miles from Saginaw, Mich., where he is putting into execution a plan that may well revolutionize the industries depending upon forests for the basic raw materials. The method is to remove from the tract only the mature trees. Underbrush and waste wood left are to be carefully cleared to protect the remaining trees against fire. The young trees will be permitted to attain maturity. In the meantime they will seed the ground about them, and when they, in turn, are cut, the next crop will have started. Thus harvests may be made in each of a period of years indefinitely. Sufficient space is left between the grown trees to permit their rapid development. E. G. Kingsford, a member of a Ford company, says concerning the venture and its possibilities: "Mr. Ford is convinced that the public interests demand a fundamental change in treat-

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ment of our forest wealth. The inevitable result of the present system will be the denuding of our forest lands. As the denuding continues woods products costs will advance steadily. Finally, denudation will be caried to the point where the need of remedial measures will be realized everywhere. At that time reforestation will be the only hope for the future, and this is a slow and expensive process. The harvesting of trees is a practical alternative. In our present test we cut trees with a minimum diameter of ten to twelve inches."

Permanent Slump Unavoidable Unless Timber is Protected

The recent slump in the lumber market and the consequent failure of the lumber companies to clear their overstocked yards of manufactured lumber has resulted in a marked reduction in the amount of lumber manufactured at the mills during the past summer season. Many firms are holding over their 1921 cut of logs in their booms until next season. The outlook for the winter is therefore not at all promising and very few of the lumbermen are cutting any quantity of logs this winter. In the back settlements everywhere there will be a quiet winter and many men and horses will be idle.

In the greater part of the province this condition is keenly felt by the people, whether farmers along the valleys of the rivers or the millmen living in the towns and villages, as these are dependent for nearly all of their wages upon the continuous production of wood products from the vast forests of the province.

In normal seasons local labor is about sufficient to supply the demand. During seasons such as was experienced in 1919-20 local labor is insufficient to meet the demands and labor is brought in from the neighboring provinces. This year only a small percentage of local labor will find jobs in the woods.

The above statements illustrate all too clearly the dependence of the people upon the lumber industry for a livlihood. Large lumber mills idle, summer ports conspicuous by the absence of lumber schooners, uninhabited hunter camps, and portage roads filled with windfalls and snow through the long winter months means empty payrolls and hungry families.

But such a condition is only temporary. The lumber industry will soon be back to normal, as business in general improves, and the perpetuation of the industry will depend entirely on the raw material available. With present methods of utilization, which are every year becoming more intensive, it is felt that New Brunswick has forest resources to provide a continuous supply for the woods products industries unless the forests are destroyed through Forest Fires which in the past have reduced the forest capital materially. Failure to realize the value of the forests was one of the main causes of such destructive forest fires. With the realization of the value of our forests and the efforts of the government to prevent forest fires, it is hoped that the wonderful forests so essential to the welfare of the province will be allowed to produce the necessary raw material for the perpetuation of the lumber industry and payroll of the people.

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New Mills, New Jobs, if Forests Stay Green

New Brunswick has been termed the "Province of Comfortable Homes," and the lumber industry has formed a very large and important part in the development of the province since the early days of settlement. In the latter part of the eighteenth and first part of the nineteenth century the cutting of white pine for ship timbers was the main industry, a considerable trade having been worked up with Great Britain. With the passing of the ship building industry the cutting of spruce deals for the English market was the main industry. During the past few decades a considerable trade has been maintained with the United States, and other manufactured products, such as shingles, lath, etc., have been shipped, in addition to all sizes of dimension lumber. Lately balsam fir and hemlock have become commercially valuable.

The development of the pulp and paper industry has during the past few years increased the value and importance of New Brunswick timber. There are now five pulp mills manufacturing pulp within the province. The advent of this great industry has materially increased the forest payroll and has made possible the development of more water power than would otherwise have been possible. At present the investigation into the value and accessibility of the vast stands of hardwood by several large concerns would indicate that new industries for the manufacture of hardwoods may be expected in the near future. In fact, everything points towards a considerable enlargement in the forest industries rather than a curtailment. Such is possible in view of the vast forest resources containing many different commercial species within the province which may be kept in a productive state by regulated methods of cutting, but which may be rendered unproductive by Forest Fires. The increased development in the industry during the past few years has been possible because of the curtailment of forest fires so destructive in the early days. Further precaution is necessary so that destruction of the forest by fire may be totally eliminated, thus increasing the amount of raw material available.

EARLY WARFARE AND OUR FORESTS.

"Thus began the memorable war (the French and Italian war) which, kindling among the forests of America, scattered its fires over the kingdoms of Europe and the sultry empire of the Great Mogul; the war made glorious by the heroic death of Wolfe, the victories of Frederic, and the exploits of Clive; the war which controlled the destinies of America, and was the first in the chain of events which led on to her Revolution with all its vast and undeveloped consequences. On the old battleground of Europe, the contest bore the same familiar features of violence and terror which had marked the strife of former generations,—fields ploughed by the cannon ball, and walls shattered by the exploding mine, sacked towns and blazing suburbs, the lamentations of women, and the license of a maddened soldiery. But in America, war assumed a new and striking aspect. A wilderness was its sublime arena. Army met army under the shadows of primeval woods, then cannon resounded over wastes unknown to civilized man. And before the hostile powers could join in battle, endless forests must be traversed and morasses passed, and every where the axe of the pioneer must hew a path for the bayonet of the soldier."—Francis Parkman, "Conspiracy of Pontiac."

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Annual Meeting, Toronto, January 10th

The Annual Meeting of the Canadian Forestry Association will be held at the King Edward Hotel, Toronto, on Tuesday, January 10th.

All members of the Association will be heartily welcomed to the morning and afternoon sessions. Between 10 and 12.30 a. m. the business session will be held. At 2 p. m. will commence a series of addresses by distinguished and interesting speakers. Full details wil be mailed to members well in advance.

CANADA'S DEBT TO DR. FERNOW.

Owing to illness which unfortunately shows little sign of improving, Dr. Bernard E. Fernow, Dean Emeritus of the Faculty of Forestry of the University of Toronto, who has been living in retirement at his Toronto residence for some time passed, has moved to the home of one of his sons at Cynwyg, near Philadelphia, and will later visit another son at Ithaca, N.Y.

Members of the forestry profession and conservationists, generally, throughout America, had anticipated that Fernow's years of retirement from active teaching would be utilized in writing and occasional lecturing, for which his vast fund of knowledge had amply prepared him. It appears probable, however, that Dr. Fernow's energies henceforth will be confined to safeguarding his health and his further contributions to the literature of forestry in America may have to be sacrificed. Dr. Fernow's monumental service to the Dominion of Canada will probably not be fully appreciated for many years to come, but it is safe to predict that in any future account of the truly great scientific pathfinders whose foresight and labours gave this country its first impetus towards conservation of the natural resources, the name of Dr. Fernow will be written in golden letters.

ONTARIO CEDAR VS. B.C. CEDAR.

Vancouver, B.C.

Editor Forestry Magazine:—

We have just received a letter from an Ontario dealer claiming that Ontario cedar is superior for shingle manufacture to B.C. cedar. What can you tell us?

Our correspondent's letter was referred to the Forests Products Laboratories at Montreal, and to a well-known lumber expert of Toronto. The replies follow:

FORESTS PRODUCTS LABORATORIES OF CANADA.

McGill University, Montreal.
24th November, 1921.

The cedar of Western Ontario is the white cedar (Thuja occidentalis, Linn), while that of British Columbia is the red cedar (Thuja plicata, Don.). The two woods appear to be about equal in durability, while in most strength function the

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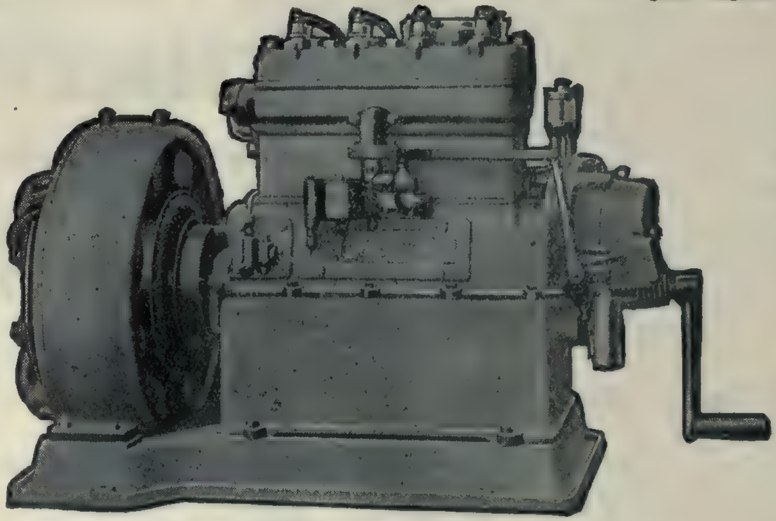

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red cedar, rather contrary to popular impressions, is superior.

As wood shrinks or expands, following changes in moisture content, much less radially than tangentially, the edge grained shingle is superior to the flat grained product which is subject to cupping and warping. The bulk of the shingles now made are edge grained. As the red cedar reaches much larger sizes than the white cedar it is possible that the edge grained shingles made from it are more likely to be strictly edge grained than those made from the smaller tree. However, I do not know how important this might be as I have not examined the shingles from that point of view.

There does not appear to be very much difference in merit between the two woods for shingle manufacture, but I should be inclined to give the preference to the red celar.

It may be of interest to mention that an investigation on the fire retardant treatment of shingles is now in progress here. As you are no doubt aware the question of fire retardant treatment is quite a live one just now on account of the restrictions on the use of shingles due to fire hazard.

Yours very truly,
W. KYNOCH,
Superintendent.

Toronto, Nov. 24th, 1921.

I am in doubt if I understand the question aright, which you have raised in yours of 22nd. It would be hard in any event to make any comparison between Ontario and British Columbia Cedar.

If we are thinking of standing timber we must recognize that not alone are the size and quality of the two species entirely different, but the density of their stand is likewise dissimilar. The only way that I know to compare them is in respect to the

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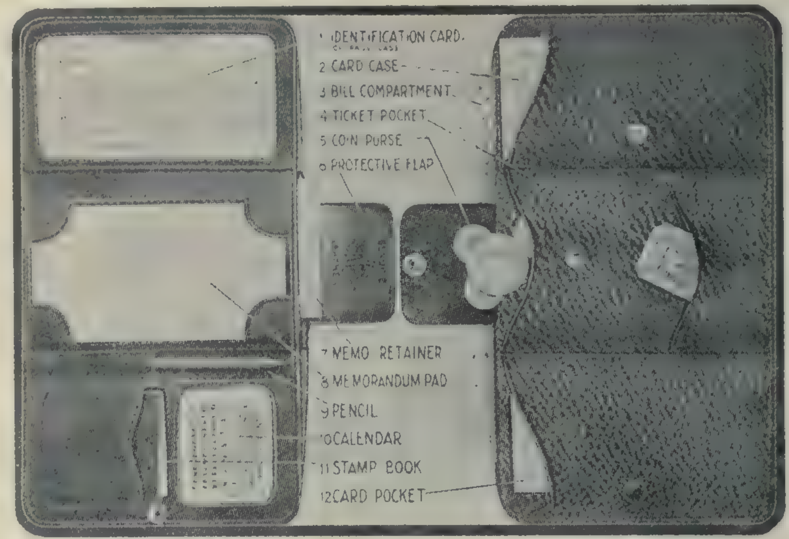

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9. Pencil ready for use.
10. Calendar for current year.
11. Postage stamp book with oiled paper dividing leaves.
12. Pocket for visiting cards or railroad tickets.

way the timber is valued in the two sections for convertibility in use. B.C. cedar is in good demand, and good Cedar logs rank even higher than good Fir logs. On the other hand, Ontario Cedar is one of our poorest species. Its chief use, as you know, is telephone poles and ties. The amount of shingles it produces is small, and the percentage of good quality so produced is likewise in the minority. For some purposes I would, personally prefer the Eastern or White Cedar shingles, but their total product is relatively so small that they can hardly be considered a feature in the shingle business.

—A.C.M.

WESTERN TREE GROWER IS ALSO GRAIN CHAMPION.

John W. Lucas, of Cayley, Alberta, a loyal member of the Canadian Forestry Association and a very successful planter of trees on his prairie farm, pictures of which have been reproduced in this magazine, is the champion grower of oats in the world. Mr. Lucas won the sweepstakes prize at the International Grain and Hay Show at Chicago against world competition, making his second triumph of the kind. It is worthy of note that Mr. Lucas is a strong believer in the value of shelter belts of trees as a farm asset.

MEMORIAL KAURI ON GRAVE.

A kauri tree has been planted on the grave of Sir David Ernest Hutchins in the Karori Cemetery, Wellington, New Zealand. The tree was planted by Sir James G. Wilson, president of the Forestry League, and among those also present were Sir Francis Bell, Acting-Prime Minister and Commissioner of State Forests, Messrs. W. H. Field, M.P., L. McIntosh Ellis, Director of Forestry, E. Phillips Turner, secretary of the Forestry Department, and members of the executives of the Forestry League and of the New Zealand Sawmillers' Federation.

Sir James Wilson said that by his very valuable reports on forest conservation and regeneration and tree planting, Sir David Hutchins had done a great deal to arouse interest in forestry throughout the country. "This tree, he observed, planting the kauri on the grave, represents the feelings of all those present toward the man who was the originator, not only of the Forestry League, but of the Forestry Department. This tree is to remind future generations of the services he rendered to New Zealand."

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